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volume **two**

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Interstate '76 delivers all the thrills of *MechWarrior 2* with muscle cars and a pumping '70s funk soundtrack. The game's protagonists remain in full polygonal glory, even in the cut scenes, to give gameplay a sense of continuity. Page 147

ONLINE GAMING: *Meridian 59* and *Steel Legions* bring gaming to the masses

Introducing the...

Next Generation Disc Edition

This month, for the first time, there are two **editions** of **Next Generation** — one with a **CD-ROM** packed with game previews and demos, and one without. Because you're reading this, we know that you've paid the extra three bucks for the **Disc Edition**. For this we **thank** and congratulate you — we think you made a smart choice.

In the **turbulent** and "**boom/bust**" **nature of the game industry**, information is power. It is on this premise that **Next Generation** was launched two years ago. Now, technology enables us to go a step further. Now we can not only tell you about **new developments in gaming**, but let you see **and play for yourself**.

Of **course**, it's still early days for the **Disc Edition**. The disc itself is quite **unique** in that it is designed to work on both Apple Macintosh and IBM PC compatible machines — and this raises a few operational bumps. Certainly, you will have many questions that the simple ReadMe(.txt) file cannot answer, and so we invite you to e-mail us at **ugp_ng_discs@imagine-inc.com**, and be sure that we will respond in a reasonable amount of time.

We plan to **improve** the Disc Edition's scope and execution over the months ahead. And we believe that as an information resource, the **Disc Edition** will grow to be as **valuable** as the magazine itself. Also, now is probably the best time to **subscribe** to **Next Generation**; it's possible to save a **massive 70% off** the cost of getting the **Disc Edition** at the newstand. Find out how on **page 32**.

Thank you for your support of **Next Generation** so far — the future will be even better.

NEXT GENERATION

NEXT GENERATION

November 1996

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Next Generation (ISSN# 1078-9693) is published monthly by Imagine Publishing, Inc, 150 North Hill Drive, Brisbane, CA 94005, USA. Periodicals Class postage paid at Brisbane, CA, and additional mailing offices. **POSTMASTER** send changes of address to **Next Generation**, PO Box 53680, Boulder, CO 80322-3680. Newsstand distribution is handled by Curtis Circulation Company. Subscriptions: one year (12 issues) US: $34. Canada: $48. Foreign: $58. Canadian price includes postage and GST (GST# R 128 220688) CPC Int'l Pub Mail #0781126.

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Produced in the United States of America.

Next Generation shares editorial with the UK-based magazine **EDGE**, and is not affiliated with NeXT Software, Inc. Unsolicited manuscripts cannot be returned or acknowledged.

Standard Mail enclosed in the following editions: B, B1, B2, B3, C

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Due to court order, Next Generation can no longer hide funny things down here on the masthead. Instead, watch for new educational masthead supplements. Starting next month, *The Vole: Nature's Little Furnace*

News

"Sega City" readies for its online launch • Nintendo 64 ships in the U.S. — so why is Nintendo acting so scared? • Force feedback is coming • Games in development news

Alphas: 55 pages of new game previews

We smash our record breaking issue of last month with 29 previews including: A profile of Sega's new coin-ops, *StarCroft*, *Interstate '76*, *Resident Evil 2*, *Wave Race*, *POD*, and more

Finals: 22 new games reviewed

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SCEA bosses MIA: Steve Race. Olaf Olafsson. Marty Homlish. Jim Whims. Heading up Sony's U.S. PlayStation operation has quickly become the videogame industry's equivalent of being ordered by Darth Vader to take command of the Death Star. It's obvious that all the big PlayStation decisions are made in Japan, so...

Will the real boss of Sony please step forward?

Teruhisa "Terry" Tokunaka is the President of Sony Computer Entertainment Enterprises, the Japanese company that is in overall charge of PlayStation operations all over the world. Despite having divisions in both the U.S. and Europe, it is Japan that really pulls PlayStation's strings, and it is Japan that should be regarded as the nerve center for all of Sony's videogame plans.

While Sony Computer Entertainment America has suffered from management turmoil (they've got through four corporate figureheads already), Mr. Tokunaka has remained steady at the helm in Japan. **Next Generation** met with Mr. Tokunaka in SCEE's headquarters in Tokyo for the following world exclusive interview.

Big fish. Little pond?

NG: Most people believe that PlayStation has been a huge triumph. What do you think the main reasons are for its success?

Mr. Tokunaka: The software, basically and foremost. From the very first day, we received great support from the software developers in Japan, and then in the U.S. , and in Europe following closely behind. Today, PlayStation is very well supported by the software industry, and we have very good products coming out.

This is for two main reasons. Firstly, PlayStation's hardware format has been very well accepted by the creative industry, and this is as a direct result of the architecture design of our engineers — at launch, the PlayStation was so advanced that the creative people were excited. And second, we also made sure that the business model was easy to accept by the software developers' management.

Also, certainly since we announced that we have exceeded five million units manufactured, and since we have the largest cumulative installed base of the next generation game formats, it means that we can offer the most competitive cost of development. This makes us more attractive to the software developers, and so we benefit from somewhat of a positive spiral. And we intend to keep this position in the future.

NG: But so far, the 32-bit business hasn't come close to equaling the 16-bit business. There were far more Genesis and Super NESs sold than there have been Saturns or PlayStations.

Will 32-bit ever catch up? Or is it destined to be a smaller business than 16-bit was?

Mr. Tokunaka: [Smiles]. I'm certainly hoping that the 32-bit business will be bigger than the 16-bit business, and that we can expand the market.

NG: Trip Hawkins argues that 32-bit systems are destined to fail, and that it won't be until 64-bit kicks in that the game industry will reach the heights that it did with 16-bit.

Even Ken Kutaragi — the designer of PlayStation — has commented that the lifespan of dedicated game systems is falling. The 8-bit machines lasted eight years, and the 16-bit machines lasted five years. So is it reasonable to expect that the 32-bit generation — Saturn and PlayStation — will last an even shorter length of time, maybe even only three years?

Mr. Tokunaka: I don't know. At the same time, maybe I should mention that the difference between 16-bit and 32-bit — PlayStation versus Genesis or Super NES — is much bigger than the difference between 16-bit and the 8-bit formats. So I do not know if the trend of decreasing lifespans will continue.

Certainly there are new factors that determine the life of a platform, so maybe it is a mistake to look at the previous systems and draw any conclusions about what is happening today.

NG: As well as making the hardware exciting for game developers, to what extent did you make sure that PlayStation's development environment was easy to use?

Mr. Tokunaka: Our engineers tried to make sure that developing games for PlayStation was easier than it was for previous generations of videogame hardware. The emphasis was put on making it easy for content creators — and not technicians — to work with PlayStation. Sometimes, despite the opinion of the management, some creative people have developed PlayStation games because they liked working with the format, and then subsequently persuaded the management to go ahead.

NG: Sega is now claiming that while your "easy" development environment may have helped PlayStation at launch, it is now a handicap.

Sega says that Saturn's longer learning curve means that although at the start it was tougher to program the Saturn, at this stage of the war Saturn developers can continue to discover new tricks and hidden power, but that PlayStation development is maxed out. Is this true?

Mr. Tokunaka: I don't know. I am not an engineer, but I think this argument is misleading. The potential level of games is a function of the basic architecture and capabilities of the format, and in that respect, I think no one will argue that the PlayStation has less power than Saturn.

But much of the power of PlayStation's software comes from the libraries, and these are constantly being updated and have grown more and more sophisticated. We started with 400 libraries, now we have in excess of 1,S00. This has been achieved in less than two years, and as a result it is very easy to produce better and better software for PlayStation.

NG: You say that at launch you were able to make PlayStation development attractive to

"management." Is this because you were using CD-ROMs instead of cartridges?

Mr. Tokunaka: Choosing CD-ROM is one of the most important decisions that we made. As I'm sure you understand, PlayStation could just as easily have been worked with masked ROM [cartridges]. The 3D engine and everything — the whole PlayStation format — is independent of the media. But for various reasons (including the economies for the consumer, the ease of the manufacturing, inventory control for the trade, and also the software publishers) — we deduced that CD-ROM would be the best media for PlayStation.

As a result, in Japan we have been able to successfully reduce the software price very substantially, compared to the cartridge days. So it was very attractive for consumers who are used to purchasing $100 software to all of a sudden have a 40% reduction.

NG: If you could launch PlayStation again, would you do anything differently?

Mr. Tokunaka: No, I don't think so. [Smiles].

Steve, Marty, Jim... who's next?

NG: Sony Computer Entertainment of America has done very well in terms of dominating the 32-bit market in the US. But there has been a surprising amount of managerial turmoil. First there was Steve Race, then Olaf Olafsson, then Marty Homlish, then there was Jim Whims.

Why all this instability?

Mr. Tokunaka: [Pause]. I don't know. [Smiles]. But all of these changes are to ensure that our basic PlayStation strategy is exercised in all of the important markets.

In Japan we make very quick and sometimes very drastic decisions as to how we want to do business. And we expect a similar decision turnaround in other markets. We use what we hear from our foreign subsidiaries in terms of market information we make decisions on a global basis. I think that the new management team in the US will be best suited for this purpose.

"In Japan we make very quick and sometimes very drastic decisions about how we do business. And we expect a similar decision turnaround in other markets"

NG: What are Sony's bigger goals? For example, Matsushita hasn't disguised the fact that it is actively working on a 64-bit game machine that will eventually incorporate both online capabilities and DVD. Surely a large consumer electronics company such as Sony must be working on a similar strategy?

Mr. Tokunaka: I'm not prepared to comment on the future. But what I can tell you is that engineers are always thinking forward, and they always dream about stuff that they may want to accomplish in the future. They are always thinking about new things and are never satisfied with the current technology — and that's why there are always technological advances.

The same is true in every market, in every industry. But I'm not prepared to discuss what we are doing. And you must remember that if change happens too quickly, it's not good for anybody.

NG: You say that one of your goals is to expand the videogame business beyond the traditional teenage boy audience. Do you feel you have been successful at doing this?

Mr. Tokunaka: Not yet.

NG: So how will you manage to increase the number of women who play games?

Mr. Tokunaka: This is what I am testing every day, with my wife! [Laughs].

NG: So does she like many PlayStation games?

Mr. Tokunaka: There seem to be some differences between what I like and she likes, and what my son likes, and what my daughter likes. It all depends on the software, and maybe there should be more women creators who will design the games that they want to play. I think these days are coming, and we will be ready to help whichever women step forward to do this.

Here comes Nintendo 64

NG: To what extent do you see Nintendo 64 as a threat to your business, and what preparations did you take for its launch?

Mr. Tokunaka: Our sales have actually increased since the introduction of Nintendo 64, so in some ways it can be seen as helping us. Maybe it was because of the increased total amount of marketing effort, so people who have not seen the videogame market for a long time are now coming again, and many of them are choosing PlayStation.

NG: Five years ago, the Nintendo brand name was very powerful. But after the hard-fought 16-bit war with Sega and the disastrous Virtual Boy, do you think that Nintendo is as powerful as it has been in the past?

Mr. Tokunaka: Nintendo is very powerful and will continue to be powerful.

NG: In Japan, Nintendo sold 300,000 Nintendo 64s in just the first week, but since then, sales have fallen. Do you see this decline continuing?

Mr. Tokunaka: It is a fact, there has been a continued decline in Nintendo 64 sales.

NG: Do you think that Nintendo 64 will ever overtake PlayStation sales?

Mr. Tokunaka: [Pause]. I don't know. We are very confident about PlayStation, so it's difficult to imagine how we can sell lesser quantities compared to N64.

NG: What are Nintendo 64's weaknesses?

Mr. Tokunaka: The software price and the cost of hardware. Also, because of the limitations of the memory capabilities — because it uses

cartridges — there are some things that the PlayStation can do that the Nintendo 64 can't.

Also, because of the cartridges, it's a lot more expensive for game developers to make games for Nintendo 64. It also takes a long time (because all the cartridges have to be manufactured by Nintendo), and it's more expensive for retailers, which means that it's more expensive for consumers as well.

NG: A lot of people consider the battle between PlayStation and Nintendo 64 as a battle between an extensive library of great games versus *Morio 64* — maybe the best game of all time. Do you see it this way? And if so, who will win?

Mr. Tokunaka: In terms of the number of software titles, *Tekken 2* in Japan has exceeded one million units in Japan already, and there are many titles that have exceeded 500,000 units. I don't know how many units Nintendo has sold of *Morio 64* , but we have a large variety of software products that are selling very well.

I think having a broad range of games is very important. From the simple consumer standpoint, when buying a videogame system they want to play good games, and they want a good variety of games. This is the main reason they purchase the system — and so PlayStation's broad library has to be a big advantage.

NG: So far, PlayStation has appealed to an older audience than the 16-bit consoles did. Does this mean that as Nintendo continues to market to its traditional teenage audience, that the games market will be split by age, with Sony and Sega taking the adults and Nintendo taking the kids?

Mr. Tokunaka: I don't think so. We certainly started with a higher demographic about one-and-a-half years ago, but we are seeing a continuous decline in the age of our customers.

NG: Is this worldwide?

Mr. Tokunaka: Yes, but I follow the Japanese statistics most closely. When we changed the price to ¥24,800 [$250] we saw a dramatic change in the demographic. So maybe the reason that we started off with an older audience was because of price. And we have been telling our licensees that we are seeing a very dramatic change in our customers. So as we are proving this, the software companies are developing the sort of games that are acceptable to a younger audience, and we are trying to create these type of games ourselves.

"PlayStation sales have actually increased since the launch of Nintendo 64, so in some ways it can be seen as having helped us"

Our current price is ¥19,800 [$200] and this makes us even more attractive to much younger generations. This price, coupled with new software, creates a combination that appeals to old and young generations. We want PlayStation to be enjoyed by everybody. This is my dream.

NG: So you won't concede a draw by giving Nintendo the young gamers and you taking the older gamers?

Mr. Tokunaka: No, I'm not confining ourselves to one particular market.

NG: Do you see 64DD, Nintendo's proposed add-on, as a solution to Nintendo's cartridge problems, and hence a threat to PlayStation?

Mr. Tokunaka: I haven't seen it, so I can't comment on it.

Falling game prices

NG: You have recently introduced a range of budget titles in Japan. This is a powerful weapon with which to fight Nintendo (because they can't match your budget prices).

Will we see more budget games released?

Mr. Tokunaka: This is something that we have to talk to licensees about concerning individual titles, but there will be more released. By the end of the year there will be at least 20 budget titles.

For the software developers, once they have recouped their original development cost and the installed base of PlayStation's has grown with new users coming in, then they are willing to reissue the same title at a lower price — and make additional profit. This is possible because CD-ROMs are not expensive to manufacture. This would not be possible on Nintendo 64.

NG: Is there not a danger that by releasing a line of budget games, consumers will be less inclined to spend $60 on full price games?

Mr. Tokunaka: I don't think so. In the audio CD market, some of the old music is sold at the discount rate — and there are also compilations

— and it has no effect on the full price market. Namco is selling the original *Tekken* at a discount price and is still selling many copies of *Tekken* 2.

The battle with Sega

NG: In Japan, the battle between PlayStation and Saturn has been very close. What is your understanding of who is winning this war?

Mr. Tokunaka: It's very close. Maybe there are some times when one pulls ahead, but I think we are very close to each other in terms of the aggregate number of units sold. Recently, however, since the launch of Nintendo 64, we have been outselling Sega by a very large margin — and hopefully this will continue.

NG: Have you ever spoken to Sega, offering them a deal to publish their games on PlayStation?

Mr. Tokunaka: I don't think so. They haven't asked us. [Smiles].

NG: If they asked you, would you give them one?

Mr. Tokunaka: Possibly. I don't know. I don't know if it would be of any interest to them.

NG: Right now, Sega is losing a lot of money, and a lot of people are speculating that Sega may quit the hardware business and instead focus on doing what they do best, which is make great software.

Mr. Tokunaka: I don't like to speculate on the business of other companies. I only discuss my own strategy.

NG: OK. You must be very pleased with the deal with SquareSoft to bring *Final Fantasy 7*, *Tobal No.1*, and all of Square's other top games to PlayStation.

Mr. Tokunaka: Yes, obviously. I am very appreciative of the fact that they chose us because their creativity could be best expressed on the PlayStation format, on CD-ROM. They could not do *Final Fantasy 7* on cartridge, and another advantage for them is that they are able to include a free demo CD of *Final Fantasy 7* with *Tobal No.1*.

"I don't believe that Psygnosis producing games for Saturn will hurt PlayStation"

NG: Could PlayStation have gotten to where it is today without the support of Namco?

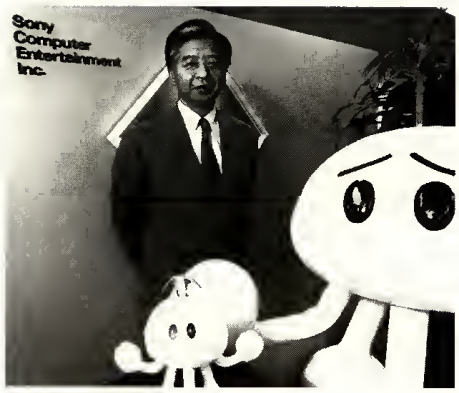
Mr. Tokunaka: We are very close to Namco. They are a key software developer for PlayStation. They are a very powerful ally in this business and I think that both Sony and Namco have benefited from the very, very strong relationship we have.

NG: Perhaps Sony's other most powerful ally — certainly in the U.S. and in Europe — has been Psygnosis. It must be very disappointing for you that are no longer exclusively working for PlayStation. Is this is a big problem?

Mr. Tokunaka: No. Psygnosis will continue to develop good PlayStation games.

NG: Does it not damage PlayStation that Psygnosis is also developing games for Saturn?

Mr. Tokunaka: I don't think so. I don't know



what quantities they are selling on Saturn, but I saw the Saturn version of *WipeOut* — and it was OK, but even I could tell the difference between it and the PlayStation version [Smiles].

So no, I don't believe that the fact that they are producing games for Saturn will hurt PlayStation.

The future of 32-bit

NG: Many people argue that the biggest threat to Sony, Nintendo, and Sega — and the reason that 32-bit sales have been smaller than 16-bit — is that the PC has taken over as the game-playing platform of choice on a global level. Do you see the PC replacing dedicated game platforms?

Mr. Tokunaka: It is hard to believe that this will happen because technology continues to change.

I remember this kind of argument from ten years ago when the first game machines were launched. There was a similar argument from the computer industry, saying that because a computer can do so many things other than playing games, the dedicated game machines would not survive. But this did not happen.

Computing power is scarce, and will continue to be so, and so there will always be a market for a low-priced choice. And because engineers are always finding new ways to provide powerful technology cheaper, they will always provide this choice. And there will always be a market for concentrated, specialized computing power — like a games machine — as well as a market for more expensive, more open, flexible computing power like the PC. This is my feeling.

NG: Historically, the game market has settled into a duopoly of two main formats battling it out for supremacy. Can PlayStation, Saturn, and Nintendo 64 all survive, or will one have to fail?

Mr. Tokunaka: I don't know, some people argue that there will be only two. But I simply don't know. I can just hope that PlayStation will continue to do well throughout the rest of this year and into next year, and then we will see how Nintendo 64 is accepted by the consumers.

If next year there are three of us left in the market, then so be it.

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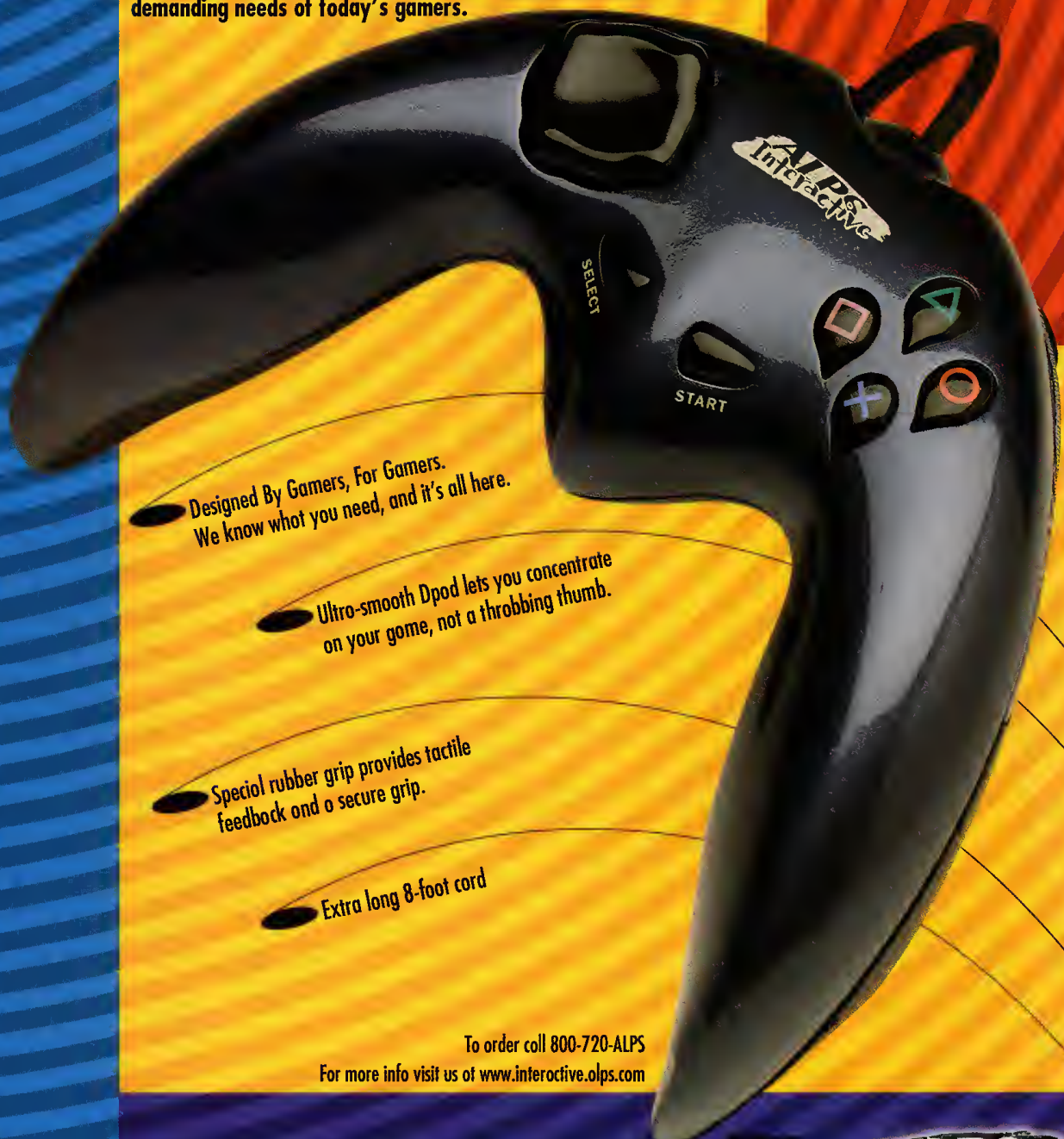

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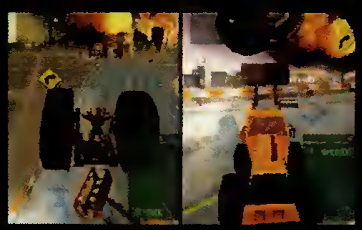

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Videogame news from Japan, Europe, and the U.S.

Nintendo's leap into the unknown

Are two great games enough? No one knows. Nintendo 64's U.S. launch on September 29 asks gamers to place their bets...

Imagine for a minute that you're Howard Lincoln, the chairman of Nintendo of America. Four years ago your company — known in the industry as the 900-pound gorilla (partly in homage to your *Donkey Kong* heritage, but more because of the way you've bullied competitors and partners alike) — was badly humbled by Sega, which used gutsy advertising (who can forget the peeing dog?) to make its products seem hipper than yours. They cleaned your clock in the process. In fact, you were elevated to the top U.S. position because the chairman of Nintendo in Japan, Hiroshi Yamauchi, booted his own son-in-law, Minoru Arakawa, out of the number one slot as a result of those plummeting sales.

You tried to take the moral high ground to cotton to a nation consumed with family values and fears about violence by releasing a bloodless version of *Mortal Kombat* and taking swipes at *Night Trap*. You got trounced yet again by Sega, which delivered all the blood; you saw *Night Trap* sell a half million units — this from a crappy FMV title, whose creators started publicly thanking their "wonderful PR department at Nintendo" for most of the sales. Although you played a brilliant catch-up game with *Donkey Kong Country*, you followed that with the introduction of the disastrous Virtual Boy.

Nintendo of America's Howard Lincoln, faces the bizarre situation of tha delayed Nintando 64 facing its toughest criticism as it finally launchas

Now, you're just about to introduce Nintendo 64 in the U.S. — a year late. Reports in the Japanese press claim that just weeks after the product's Japanese launch, it's being turned into sushi by the Sony Playstation — which sends your stock plummeting on the Tokyo exchange, until trading is actually halted. One of your best hardware designers, Gumpei Yokoi, has just walked out the door. You've got Sega about to deploy an enormous ad campaign touting *Nights* for Saturn, as its NetLink readies for an aggressive launch. A guy in a *Crash*

"If you had to paint the bleakest possible picture, you could. Then I'd look at you with a big smile, and I'd say '*Mario 64*'"

Howard Lincoln, Nintendo of America

Can Nintendo 64 triumph in tha U.S.? Nintendo is confidant

STOP press

No Nintendo 64's for Europe — yet
U.K. and European gamers are currently looking enviously over the Atlantic, as Nintendo has announced that Nintendo 64 will not launch outside of Europe and the U.S. this side of Christmas.

Rumors persist that Germany may end up with 50,000 Nintendo 64's, but the rest of Europe will have to go without.

On-line gaming, friend or foe?
While the online gaming boom seems to be great news for gamers, one group who isn't happy about it is the store owners.

A new report from Datamonitor predicts that online gaming could take 20% of the entire gaming business within four years — and that means less games being sold at stores.

$149 PlayStation?
Rumors persist that following Nintendo 64's dip to $199 from $249, Sony will react by dropping the price of PlayStation from $199 to $149.

Although this move doesn't seem to sit with Sony Japan's desire to keep prices high, it would probably be enough to ensure — and perhaps even extend — Sony's lead in the next generation videogame race.

Psygnosis bidding "starts at $300m"
Psygnosis, the company that Sony bought for less than $30m two years ago, is now enjoying watching the bidding for its impending sale reach numbers ten time what it paid...

Bandicoot costume is laughing at you outside your own corporate headquarters. Sony is boasting that it'll have 127 Playstation titles on shelves by Christmas. Both your competitors are at sub-$200 price points, and they play software from $49 CDs. You've only got two games for launch: *Super Mario 64* and *Pilotwings 64*; each of them $69 cartridges.

An ordinary mortal in this situation might say: "I think it's time for early retirement." Especially in an industry where people go down as if they're pop-up targets in a new level of *Doom*: Sega CEO Tom Kalinske and product development VP Joe Miller took bullets in the head as the result of disappointing Saturn sales; then there were Sony US co-operating executives Jim Whims and Angelo Pezzani, who insisted to their proud Japanese parent company that even mighty Sony needed to be value-priced to gain market share. So successful was the Playstation launch that their narrow-minded superiors decided the Sony brand had obviously merited a premium price rather than a discount price, and gave the two theirs.

But read Howard Lincoln's lips: "If you had to paint the bleakest possible picture," says Nintendo's man in the hot seat, in an exclusive interview with **Next Generation**, "then that would be the picture you just painted. And then I'd look at you with a big smile, and I'd say three words: '*Super Mario 64*'."

But is he right? Is Howard Lincoln's confidence justified? The fact is that no one knows — yet.

The launch of Nintendo 64 on September 29th (actually, the first U.S. units went on sale three days earlier on the 26th — having shipped from Nintendo's distribution HQ in South Bend, Indiana on the 25th), was a leap into the unknown.

No one in the game industry knows for sure how damaging it is for Nintendo that only two games are available at launch, but then know one has dealt with a game like *Super Mario 64* before. No one knows how significant it will be to consumers that Nintendo 64 is a 64-bit machine, whereas its competitors are "only" 32-bit. No one knows for sure whether cartridges will be an advantage or a handicap. In short, gamers are in the strange position of at last having all the facts and the hardware in their hands — but being none the wiser as to just how big it's going to be.

The shocking truth is that no one at Nintendo knows either.

Certainly, the history of the computer and games industry has been defined by so-called killer apps that have pushed the sales of hardware: *VisiCalc* for the Apple II, *Lotus 123* for the IBM PC; *Pong* for the Atari VCS; the original *Mario* for the NES; *Sonic* for Genesis. Even we at **Next Generation** two months ago used the five words "greatest videogame of all time" in apposition with the three "*Super Mario 64*." But can one game do it by itself?

Nintendo 64 launched in Japan on June 23. Sales briskly reached 800,000, but then quickly slowed

And if *SM64* is indeed the game that makes all others pale and stale by comparison, why does Nintendo seem to be running scared? Why did the company in August decide to lower N64's price by $50 to $199? This after the company had been saying for months that it could get "only" 500,000 units in time for Christmas, and warning everyone to reserve their units in advance. The laws of supply and demand generally indicate that you don't reduce price when demand is expected to exceed supply. Is Lincoln in fact worried that not being at price-point parity with Playstation and Saturn is corporate hara-kiri? Have more N64 units miraculously materialized? Is Nintendo actually *scared*?

"I think we could have raised the retail price from $249 to $300 and still sell it out," says Lincoln. "But I don't think that it would be in our best interest, or treating the consumer in a very credible way. We dropped the price because we know that ultimately, the $249 price is going to come down, and I don't feel comfortable with the idea of gouging the first five hundred or so thousand game players who pay full price." Certainly, this is an uncharacteristically altruistic sentiment for the chairman of the game industry's

Who is it?

A former managing editor of Next Generation, he has left the magazine to head up a new WWW-site dedicated to Nintendo 64. The site promises to deliver daily reviews, news, and previews

breaking

900 pound gorilla. "But also," Lincoln adds, "this will put the maximum competitive pressure on Sony and Sega." That's more like it. But why — if Nintendo 64 is doing as well in Japan as Nintendo claims — the sudden need for extra pressure on Sony and Sega?

Of course, there has been speculation that Nintendo lowered its price after a Japanese newspaper reported that NU64 sales had taken a precipitous drop (especially vis-à-vis Sony) after its first five weeks of sales. And if Nintendo 64 really is under-achieving in Japan, it not only casts a dark cloud over its performance potential in the U.S., but also it frees up more hardware units for the U.S. market — and these two factors would probably lead to a $50 price drop.

But this theory "is nonsense," according to Lincoln. "The pricing decision was made long before these articles even appeared. A Japanese newspaper wrote an article that was absolutely on its face flat false, but as you might expect, a lot of damage was done in the process."

But there's certainly no denying that sales of Nintendo 64 have slowed dramatically since launch.

"There is no basis for these rumors that somehow Nintendo 64 has fallen off the wall," Lincoln maintains. "The fact of the matter is that we are very, very pleased with what is going on in Japan. When you can sell through a million hardware units in the middle of a heat-wave in the summer in Japan in the space of five weeks, you gotta admit, that's not bad."

And the slow down is sales is no more dramatic than Nintendo had anticipated? "No," Lincoln maintains. "Absolutely not." So why the need to put more pressure on Sega and Sony by dropping Nintendo 64's price? "First of all," he says, "we did it because we have been the leader in the videogame business for many years in the U.S., and we want to maintain that leadership. Second, by going to the $199 price point now, it really does enable more people to get into the category, and more people to play *Super Mario 64*."

But Nintendo was supposedly facing a sell-out situation anyway. By dropping the price to $199, no more people are able to buy one. Looking for clues within Nintendo itself proves fruitless. On the departure of Gumpei Yokoi, the designer of the original NES, Lincoln says, "it's an absolutely coincidental happening. I have known Mr. Yokoi for fifteen years, and he's a very good friend. I have known for some time that he wanted to go out on his own and develop games, and I know that while we were disappointed to see him leave, he is going to be developing games and hardware for Nintendo on an independent basis."

Perhaps it is the lack of games that forced Nintendo to reconsider its position. The games business has always been driven by software. Nobody wants to buy an electric drill; what they want is a hole in the wall. And what you get with Nintendo 64, at least out of the chute, is two pieces of software. To some that would be $170 per hole, which is not what most consumers would call value pricing.

Lincoln contends that this is merely a short-term issue, and that price-per-hole, so to speak, will decrease rapidly over time. "If Mr. Yamauchi is known for anything," says Lincoln, "it is his feeling about how the videogame industry can only survive if quality games are made. I don't believe that it is possible to make quality games when you're releasing 127 games on Playstation. But Mr.

"There is no basis for these rumors that Nintendo 64 has fallen off the wall. We are very, very pleased with what is going on in Japan"

Howard Lincoln, Nintendo of Amenca

It is...

Douglass Perry. The site, *N64.com*, is the premiere site of the new Imagine Games Network, and can be found at: http://n64.com. All at Next Generation wish both Doug and *N64.com* well

Dream Team Update

Nintendo has released an up to the minute list of companies who have been granted "Dream Team" member status. So, just for the record...

Hardware:
- Silicon Graphics
- Rambus

Development Tool Partners:
- Alias/Wavetront
- Multigen
- Software Creations
- Nichimen Graphics
- Paradigm Simulations.

Game Developers:
- Angel Studios
- DMA Design Ltd.
- H20 Entertainment
- LucasArts
- Paradigm Simulations
- Rare
- Software Creations

Game Publishers
- Acclaim (*Turok: Dinosaur Hunter*)
- BMG (*Silicon Valley*)
- EA (*FIFA Soccer*)
- GT Interactive (*Ultra Combat*)
- Gametek (*Robotech: Crystal Dreams*)
- Mindscape (TBA)
- Ocean (*Mission Impossible*)
- Time Warner/Williams (*Wayne Gretzky Hockey*)
- Virgin (*Freak Boy*)
- Williams (*Doom 64, NBA Hangtime, Mortal Kombat Trilogy, War Gods, Robotron X*)

If it were any other company than Nintendo, and any other game than *Super Mario 64* (right), then the launch of Nintendo 64 would have to be regarded as a complete disaster. But as it stands, it is difficult to argue with Howard Lincoln's confidence — at least, until Sega and Sony respond

The real Mr. Yamauchi

Andrew Pollack of the New York Times reported on Nintendo Corporate Limited's Chairman, the fearsome Mr. Yamauchi, and uncovered the following snippets.

- **Mr. Yamauchi does not pursue any hobbies except the Japanese strategy board game Go. He is a master.**
- **All Nintendo employees are invited on a company trip every year. Much fun is had at theme and amusement parks. Mr. Yamauchi never attends.**
- **Unlike many entrepreneurs, he does not participate in any civic associations. To those who criticize his low profile among the community at large he answers: "I think I am involved in community service sufficiently. I'm the biggest individual taxpayer in Kyoto and Nintendo is the biggest taxpayer over all."**
- **Howard Lincoln has this to say on his boss: "He's a tough old bird. He doesn't think about anything except Nintendo."**
- **When unhappy with an employee's performance he calls them "dasai" which, roughly translated, means "lamer."**
- **Technical and creative staff say he never unduly interferes in their work.**
- **When asked to take over Nintendo at age 21, Yamauchi's demanded his cousin be fired first.**
- **Now aged 68, he says he wants to retire but won't because, "I don't think there is a good successor at this time."**

Yamauchi put his money where his mouth was, and he said: 'I'm serious about this quality issue. Let's take the time to make certain that these other launch titles are as good as they possibly can be'."

Admirable sentiments, certainly. But we've all heard it before, and after a year delay waiting for software, there are still only two games. Surely this has to be considered a disaster. "I can tell you that there is certainly some disappointment that there isn't a third or a fourth or a fifth software title," Lincoln concedes. "But that is going to be changed within a matter of weeks. When you see *Wave Race* and you see *Shadows of the Empire* and you see *Killer Instinct 2*, I think you're going to say to yourself, 'They did it again'."

But even if Nintendo is able to produce the dozen titles it claims will be available for Christmas, it may be squeezed by market forces beyond its control: the cost of manufacturing cartridges for the system dictates that titles sell for $70-80 at retail. Sony and Sega can drive retail price-points down significantly by reducing licensing fees (currently about $7 per game). A CD itself in a package costs just $3 to manufacture, versus about $30 for an N64 cart. Many in the games industry have predicted a massive software price war this Christmas — and this is a battle that even the mighty Nintendo will have a hard time winning.

Ironically, Nintendo has painted itself into this corner because the vast majority of the company's profits have traditionally come from manufacturing cartridges for third parties, and it may be very difficult for Nintendo to change this corporate mentality. 64DD, the promised "bulky drive" peripheral is yet another proprietary device, and it will be difficult for the price of its media to approach the sixty cent cost of pressing a CD. But then again, it's rumored that it will come bundled with a version of *Zelda* for a price of $99 that just might make **Next Generation** eat its words regarding *Super Mario 64*. And how many of those Playstation and Saturn titles will earn five stars in these pages?

"Let's face it," says Lincoln, "Sony and Sega, these guys put on their shoes one at a time. They take *Super Mario 64* home and they're playing it. You know what I think they're saying to themselves? They're saying: 'God Damn it! I wish to hell our companies had made a product like that'."

And despite all of Nintendo 64's problems — he's probably right. ng

In the studio

Games in development around the world

LucasArts is set to release another addition to its *Secret of Monkey Island*, comedy graphic adventure series. The first two games were blockbusters on the PC and the Amiga throughout Europe, although they never matched this level of success in the U.S. LucasArts hopes, however, that *The Curse of Monkey Island* may buck this trend when it is released in the U.S. in, "the first half of 1997."

According to reports in Japan, Namco is to publish games for the Nintendo 64. Apparently, both companies hope that *Rave Racer* will replace the three-year-old *Cruis'n USA* as Nintendo 64's flagship driving game. Quite how enthusiastic Sony is about this news remains unclear at this time...

EA has inked a deal with Blizzard for the exclusive worldwide rights to develop, publish and distribute console versions of *WarCraft II* and *Diablo*. "Our agreement with Blizzard exemplifies our commitment to seek out and partner with industry leaders and top creative talent," predictably droned EA's CEO Larry Probst.

Still, the games should be exciting.

Heart of Darkness has been delayed once again. Amazing Studios' epic is best known for its stunning visuals and has been in development for nearly four years. It was set to appear on PC and Saturn late this year. However, Virgin — the game's publishers — has stated that it definitely won't be ready until late 1997.

Konami is to launch a "top-shelf" version of its hit shooter *Parodius*. *Sexy Parodius* will essentially be the same as the original side-ways scrolling *Parodius* (which itself was a spoof of *Gradius*) except with graphics appropriate to such a title. It will only be available in Japan.

Mindscape has confirmed that its planned Nintendo 64 title, *Monster Dunk* has been canned. Sources at Mindscape say that the development team "just wasn't behind the concept" (whatever that might mean). Suffice to say that Mindscape has decided to cease development on the project. It has, however, confirmed that a new Nintendo 64 title will begin development shortly.

Team 17, the small company responsible for *Worms*, is working on *Project X2* for PlayStation, a sequel to its Amiga shooter from a few years ago. While the original *Project X* didn't enjoy massive success in the U.S., Europeans were delirious over the fast paced 16-bit shooter — and will probably go a bundle on this one, too.

In a move which will shock many in the game industry, Sega has canned development of Saturn's *Sonic X-treme*. The game, which was due to be released late this year, has been "indefinitely postponed." Evidently, the title, which was being developed in the U.S., was inspected by executives at Sega who did not feel that it would stand up effectively in the hostile 32-bit market. Clearly, Sega's reputation would have taken a severe blow if Sonic X-treme had been released and had not compared well with *Mario 64* or *Crash Bandicoot*. Clearly, the game wasn't going to.

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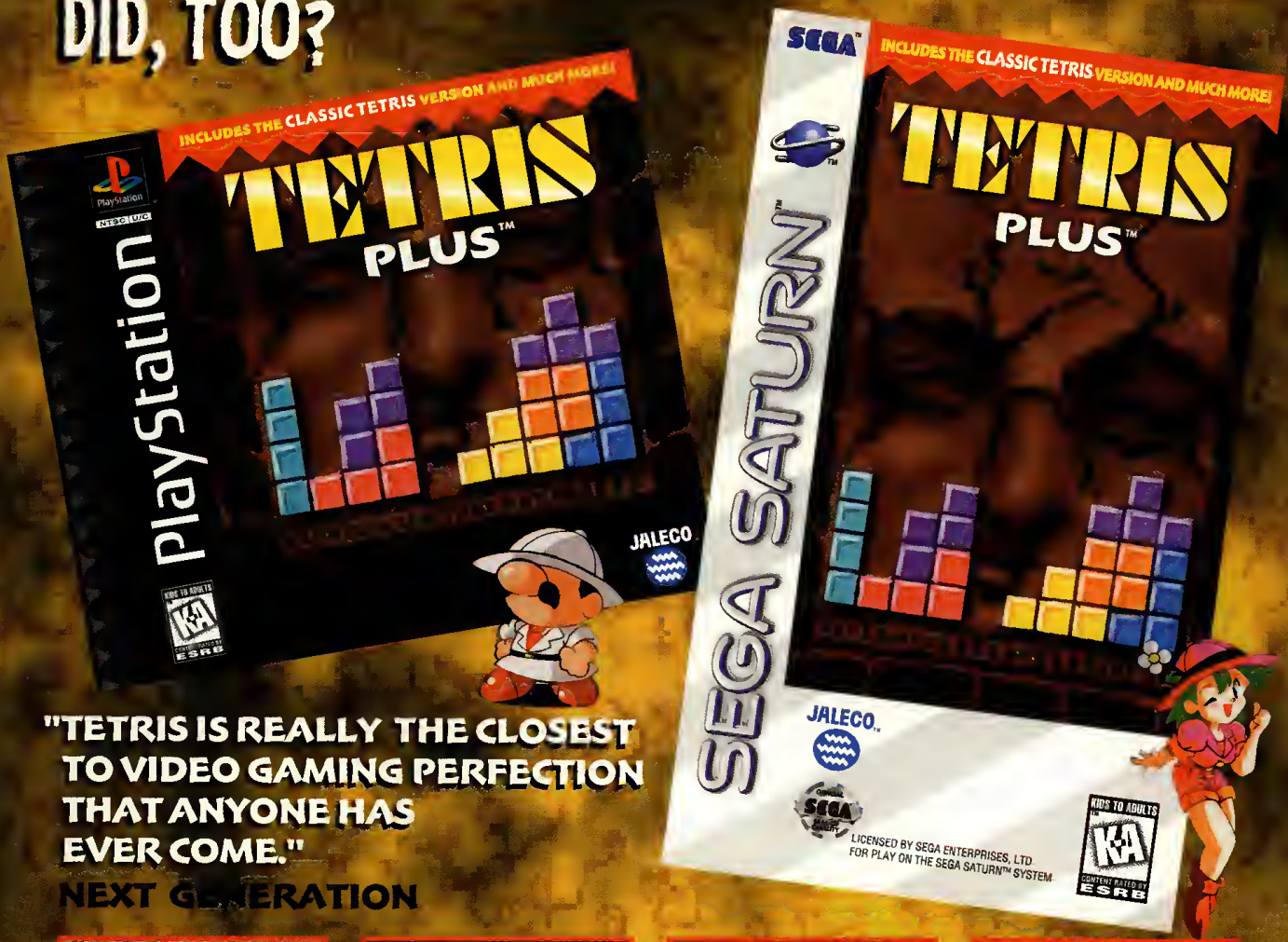

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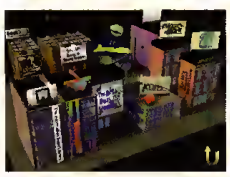
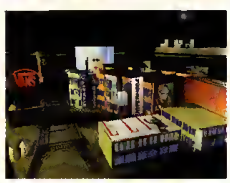
"Sega City" nears online launch

Saturn's NetLink peripheral readies for launch. But so far, the one thing missing is the games...

Sega's most sophisticated peripheral to date, the Saturn NetLink, is falling into place for an October 30 launch. At press time, the pack-in browser developed by PlanetWeb was operational, and the NetLink's homepage, code named "Sega City" was well under construction.





With a funky cityscape design, Sega City will offer special interest areas and services for NetLink user

According to Sega spokesperson Dan Stevens, Sega City was designed in cooperation with Ark Interface, and will offer "an AOL-like community, with services such as being able to purchase concert tickets online." More importantly for gamers, it will eventually provide the interface for online Saturn gaming. Stevens was vague on a date for U.S. NetLink gaming, saying only that it would be available "shortly after" the NetLink launches, and that Sega plans to make an announcement regarding the use of XBand technology.

NetLink gaming is already up and running in Japan, so there shouldn't be too many problems bringing a similar gaming service to the U.S. Until that time, Sega City users can browse the WWW, as well as checking out hobbyist areas, ranging in scope from books to fashion. With over 100 participating companies, the city offers a diverse array of sites, including Crayola, Vans footwear, *Car and Driver* magazine, and MCA music.

While Sega may hope the NetLink will boost Saturn's appeal, Sony and Nintendo are still holding back any plans to introduce a similar modem-based peripheral.

"We're focused on developing the best games for our platform right now," says Jeff Fox, Sony's Senior Director of Public Relations and Promotions. "The R&D department is constantly exploring various advances in technology, and while an Internet browser is technically possible at this time, we don't have a business plan for one."

To access the WWW from Sega City, NetLink users will employ a browser designed for Sega by PlanetWeb. Oddly enough, this product was not nailed down as the pack-in browser until after the NetLink debuted at E3, where demos were given using Japan's Aplix browser.

According to Ken Soohoo, founder of PlanetWeb and the former VP of Engineering at Digital Pictures, his browser was written in C language by a crew of game programmers, and subsequently runs on a lean 570K as opposed to a PC browser which averages about 6MB. The initial browser supports HTML 2.0 with most 3.0 extensions, and loads via the CD drive. While Sega would not announce how many units it plans to ship by year's end, Soohoo projected 100,000 copies of his browser would be sold during the holiday season.

Surfing the Web NetLink-style

The browser cleanly reproduces WWW images on a television screen, with only some fuzzing of bright reds. Using what Soohoo called "anti-aliased fonts," 60 characters of text per line are cleanly reconstructed with minimal flicker. Because of the Saturn's lack of RAM, the browser only downloads one page at a time, but it does so quickly. Without a hard drive cache, however, repeated visits to the same site are naturally more time-consuming. To keep up with evolving WWW technology, PlanetWeb subscribers will receive browser CD upgrades.

Let's hope Sega brings the gaming features online ASAP.

Crib sheet

Stuff every gamer should know. This month, gaming's bleakest hour:

No. 5 *Myst*

So what is it? Yawn. One of the top selling "games" of all time. **You don't sound impressed.** Nope. **But it's so beautiful.** Who cares? Every screen is static. You might as well watch a slide show. Pretty? Yes. Boring? Totally. **Boring? There's so much to do.** No, there isn't. Lots of levers and buttons hardly counts as interaction. The puzzles are based exclusively on trial and error: the epitome of poor game design. **But it sold 7 million copies. That must mean something.** Not really. Its technical simplicity meant it was one of the first CD products that reliably worked. Many early "multimedia" PCs had it packed in, and early buyers, few of whom were gamers, had little else to show off with. *Myst* got lucky. **That can't be the only reason.** True. The designers were good at creating a facade of mystical nonsense: you weren't stuck because the game was bad, but because you just didn't "get it." **How do you know it's nonsense?** Simple: the ending isn't an ending, it just cynically sets up a sequel — which hasn't materialized because they're busy with book and movie deals. Real gamers. **Why the grudge?** *Myst* led many publishers to believe that pretty screens meant more than pace and logic. We're still recovering.

If the game graphics don't blow you away, one of these will.

Go where no man has ever come out alive. Notice we said "man."

Treasure seeking, puzzle solving, alligator wrestling, and still time for a fight.

SOMETIMES, HAVING A

Sometimes, you also need guts. Or a brain. Or quick feet. Other times, you need all of the above plus grenades, a shotgun and a matching pair of nine millimeters. Such is your fate when you control Lara Croft, heroine heartthrob of Tomb Raider.

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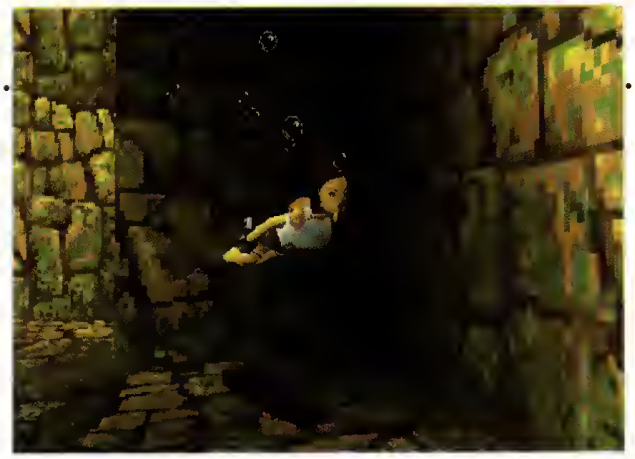

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All the latest arcade and coin-op news

by **Marcus Webb**

Marcus Webb is the editor-in-chief of *RePlay* magazine, the US' leading trade amusement magazine

Street Fighter 3 In December

Reliable sources in Japan say that Capcom will launch the long-awaited *Street Fighter 3* in December, at least to the Japanese market. Look for it by February of '97 (at the latest) in the U.S.

SFIII will be the second game to utilize the new Capcom System III (CPS-III) hardware, which will reportedly consist of a main board containing a 32-bit CPU and flush memory, plus a software case with CD-ROM player and a sub-CPU.

Reliable sources say that *SF3* and other early games on System III will not offer advanced CG (computer graphics) images along the lines of the best Sony PlayStation games, such as Capcom's own *Star Gladiator*. Capcom tried to incorporate CG but just wasn't satisfied with the quality. So, although CPS-III can process four times as much data per second as its predecessor, with 16 times as many colors on screen at once, they'll stick with more conventional-type graphics "until CG quality improves."

A game called *Wizards* will be the initial release for the new system.

WMS To Use "**NANI**"; The Modem Race Is On!

Chicago-based Williams/Bally-Midway, makers of the *Mortal Kombat* series and other top arcade hits, has confirmed that it will use modem-based technology from the National Amusement Network, Inc. (NANI) in a new arcade video game this fall. NANI President Gene Urso says the latest version of its technology incorporates some Microsoft product and has the capability to download games from the factory to hardware in arcades, via phone lines.

In addition, Williams is gearing up to expand the ongoing field test of its own proprietary network system, called the "Williams Action Video Entertainment Network" or "Wavenet." The WMS network has capabilities for downloading and for remote interactive gameplay (you can enter an arcade in New York and compete in realtime against a pal in California, for example).

Meanwhile, Incredible Technologies (another Chicago videogame factory) is blazing ahead with production shipments of its modem-equipped game *Peter Jacobsen's Golden Tee 3D Golf*. I.T. has been running a series of very successful cash tournaments across several states.

Besides WMS, I.T. and NANI, we have heard official confirmations in recent months from Sega and Konami that these factories are working on similar projects for downloading, networked tournaments and/or remote interactive gameplay. No doubt some other "majors" are doing likewise; they just haven't admitted it publically — yet.

Microsoft Seeks "Coin-op Revolution"

Microsoft is committed to getting the arcade videogame industry to adopt an open, Windows PC-based standard over the course of five years. By fall — perhaps even at this month's AMOA International Expo — Microsoft is expected to announce its partners in the effort and more specific plans. Sources tell us that up to 30 home videogame creators may begin using Microsoft's Windows NT client/server workstation operating system to offer advanced games to arcades.

Bold **Internet/Coin-op** ventures planned

A growing number of companies are offering Internet-based videogame products, or planning to do so soon.

The CyberCade universal videogame platform uses the Internet to deliver remote interactive, multi-player games. Modems, PC architecture and Microsoft Windows 95 are included in a stainless steel cabinet with bill acceptor and CD player. The firm also makes an Internet product to vend business services. Machines were created by Public Access International Corp.

And, Nintendo is joining forces with Microsoft Japan and with the giant Japanese trading company Nomura to create an Internet information and entertainment service for the home, using PCs and special modems to receive digital satellite broadcasts (no phone line connections) by June 1997. Satellite Digital Audio Broadcasting will be part of the venture.

Sneak Peak at **Steven Spielberg**'s Arcade

As reported in earlier editions of this column, Sega GameWorks is designing a new type of arcade with heavy input from partner Steven Spielberg. The first one, slated to open in or around Seattle on February 1, 1997, will have different rooms, each geared to a different demographic slice, with a variety of equipment, theming and even different music in each room to appeal to the broadest possible range of customers. Equipment will range from pool tables to advanced video simulators, virtual reality and sitdown videogame versions of theme park rides.

Ratings **Inspected**

For several years, the leading voice in Congress calling for less violence and more ratings on videogames has been Senator Joseph Lieberman (D.-Conn.). A top Lieberman aide visited three Washington, D.C.-area arcades on August 20, accompanied by game industry representatives.

In all three arcades combined, the group found a total of only three games with any ratings whatsoever. Most kids were reportedly crowded around the more-violent games, too. Lieberman's aide reportedly thinks this is a great "family values" issue for his boss to flog, so look for more pressure on the videogame industry.

Washington wants ratings symbols to show up on the monitor in the attract mode — and some parents would like ratings symbols to flash on and off every few seconds during actual gameplay, too.

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Generator

The issues affecting the way games are made

by George Zachary

George Zachary, who, when working with Silicon Graphics, was interviewed in NG 14, is now a partner at Mohr Davidow Ventures, a technology venture capital firm. To contact George try sending email to him at gzachary@ mdv.com

You see games. You hear games. Why can't you *feel* games?

Videogames have traditionally involved visual and auditory feedback — the game emits sounds and shows pictures on a TV screen. "Haptic" feedback, however, remains largely unexplored.

Haptic feedback is the information transmitted to the brain from pressure on a person's physical body (including the skin, muscles, or skeletal system) and it comes in two main forms. "Tactile" feedback is interaction with a local patch of skin (sensing the temperature, contours, or texture of a surface with your fingertips, for example). If there is enough force, this interaction also affects the surrounding muscular and skeletal systems, in which case it is called "force" feedback.

We'll examine force feedback in more detail next month.

Tactile feedback

usually involves pressure on the fingertips. In the world of gaming, tactile feedback could be used to search through dark corridors for secret doors in adventure games, to feel the grip on a baseball or football in a sports game, or let you know that you've picked up a power-up.

Up until the 1980s, tactile feedback research occurred almost exclusively at universities and government think-tanks. This research was focused on industrial and defense projects, like controlling remote nuclear plant cleanup robots.

At the end of the '80s, two companies offered the first commercial tactile feedback products. The first was VPL Research, which developed and marketed the DataGlove — a mechanical glove that calculated the position and orientation of the user's hands and fingers. This data could then be input into a computer and be used to manipulate visual objects on a TV screen; like a virtual hand, for example. It was a novel input device, but it didn't offer anything in the way of feedback — essentially, it was just a new type of joystick.

Mattel released the PowerGlove, a stripped-down version of the DataGlove for the NES. But despite sales of almost one million, it sank quickly with no software support.

Soon after, a few garage-initiated companies developed pneumatic air bladders and metallic alloys that would work with products like the DataGlove. The idea was to use moving parts within the glove to provide tactile feedback.

The pneumatic

air bladders, when placed in the glove next to the fingertips, would inflate and deflate to simulate the fingers touching a virtual object. They could crudely simulate tactile pressure, but took too long inflating and deflating, which created the perception that most objects were rounded. The metallic alloys also created the perception of tactile pressure by bending from an "off" to "on" position when electrically signaled.

While both of these technologies created a crude impression, they were not ready for the prime-time consumer market: The air bladders had tubes going to and from the glove, and had to be attached to an air compressor; The metallic alloys were lighter weight, but delivered electricity to areas near your hand — and this didn't inspire visions of consumer safety.

Most difficult, though, was the software development process. In order for tactile feedback to play a role, someone would have to geometrically model 3D objects and perform real-time processing of when your fingers had potential contact with virtual objects. But few in the gaming field were skilled at this 3D modeling at the time.

More importantly, the processing muscle necessary for a PC or game console to perform these tasks was gargantuan (and still is today). Plus, the less flat an object's surface, the more calculations are required to accurately create the virtual object's surfaces. It's a real power hog.

Additionally, users weren't motivated by the quality of the experience to want to put on a glove every time they wanted to play. It was too much hassle for little gain.

Currently, no

commercial or research activity shows any sign of finding the right mix of price point, technologies, and interface that can bring tactile feedback to gaming. Essentially, the world of tactile feedback is one of science fiction.

There is good news, however. "Hold on" till next month to hear about *force* feedback...

NG Online update

http://www.next-generation.com/

Next Generation Online is the world's leading videogame website. It's updated each weekday with news, demos, previews, special reports, interactive forums, and more.

Let's talk

As a part of our service, we offer you the chance to chat live with some of the people who shape the game industry. All you have to do is download the *Palace* software from our site (it's free) and show up at the appropriate time. Here is the current schedule of conferences:

- **Oct 22**: Next Generation staff
- **Oct 29**: Psygnosis
- **Nov 12**: Sega

All conferences begin at 6pm Pacific. We hope to see you there.

Demos

The latest demos are always available at *Next Generation Online* first. Here are some of the latest additions:

- *Abuse* (Mac), Bungie
- *Bug!* (PC), Sega
- *Deadlock* (PC), Accolade
- *Diablo* (PC), Blizzard
- *Flight Unlimited* (Mac), Looking Glass
- *Monster Truck Madness* (PC), Microsoft
- *Road Rash* (PC), Electronic Arts
- *Triple Play '97* (PC), Electronic Arts
- *WarCraft II* (Mac), Blizzard
- *War Wind* (PC), SSI
- *Z* (PC), Virgin

Be sure to check out what's happening at *Next Generation Online* every day at:

http://www.next-generation.com/

[9]**Next Generation OnLine,** http://www.next-generation.com/

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The business news that affects the games you play

by Christian Svensson

Christian Svensson is the assistant editor and webmaster at Next Generation Online which can be found at http://www.next-generation.com/

PSYGNOSIS BIDDING HITS $300 MILLION

NEWSLINE: Bidding has begun on the rights to buy Psygnosis from Sony. Already, extremely large numbers are already being discussed with the minimum initial bid at $200 million. It is rumored that a $300 million bid is already on the table.

BOTTOMLINE: Sony bought Psygnosis in May 1993 for less than $30 million, and is now set to make a massive profit. Wallet-waving parties are said to include Acclaim, Electronic Arts and GT Interactive. Viacom has also baen linked with the deal.

The acquisition of Psygnosis by a company already involved in the game industry would certainly make one of those companies the clear market-leader. However, some believe an outsider will win the bidding. Communications companies are hovering as well as blue sky technology firms with plenty of ready cash.

Psygnosis' worth has risen immensely during the development and launch of PlayStation. The company has given Sony guidance and excellent product — albeit with a few headaches. More profit potential is being sensed as the next-generation market continues to bloom and Internet gaming arrives. Also, Psygnosis has only just begun to make its presence known in Japan and the rest of Asia as well as on non-PlayStation console platforms such as Sega Saturn.

SMALL PUBLISHERS FEEL PINCH

NEWSLINE: Gametek has scaled down its publishing activities and handed much of the job over to Philips. Rocket Science has decided to let Segasoft market and publish its promising new batch of products.

BOTTOMLINE: The continued focusing of the game industry into a core of half a dozen publishing giants continues apaca. Although there are far more publishars than six right now, their numbers diminish every week as small companies are attracted to larger, larger, and even larger corporate "partners" with which to ally.

NOLAN BUSHNELL IS BACK!

NEWSLINE: Aristo in association with Nolan Bushnell is readying the launch of a range of net-based arcade machines which will be targeted towards adults of both genders.

The TeamNet range will be the first coin-ops to enable two teams of up to four players each to compete against each other in sports or other games. Both teams may be physically present in the same location, or in separate locations competing over the Internet. TeamNet has been specifically designed to support tournament play.

BOTTOMLINE: Bushnell says coin-op manufacturers are too narrow-minded and are ignoring adult men and women in favor of the core-market of teenage boys and young men.

Bushnell believas his style of gameplay will appeal to an audience which sees little fun in playing against a computer AI. He says: "Adults have more fun with other adults than they do with games and we've created an online environment that resembles the old-time party lines, where there's a little mystery involved," he said. The online gamas also incorporate chat facilities: "Chat is in some ways more important than the games themselves."

PUBLISHER FIGHT FEST ERUPTS

NEWSLINE: After a period of relative peace, legal scraps have been breaking out all over among publishers. Acclaim has been battling it out with MicroProse over who owns what in their respective *Magic: The Gathering* licences. GT has been attempting to block MicroStar launching a compilation of *Duke Nukem* levels. And everyone in the first-person-*Doom*-style market has been levelling shots at competitors.

BOTTOMLINE: You can blame the inevitably hot-headed and youthful nature of the game industry. You can blame the large sums of monay floating around. You can even blame the weathar. Either way, when it comes to the much touted impending maturity of this industry, it seems like we'ra in for a long wait.

SPIRIT OF ATARI LEAVES

NEWSLINE: Don Thomas, considered by many to be "the spirit and voice of Atari" has finally left the company. For years, Don Thomas banged the drum enthusiastically for Jaguar. Thomas has finally left Atari (which has recently completed its merger with JTS) and will be taking a job at Sony.

BOTTOMLINE: There's this fat lady, see. And she's making an awful of noise...

[9]Next Generation OnLine, http://www.next-generation.com/

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Gaming on the Internet

UNDERGROUND

Play games on the Internet for free? As in, *no charge*?

The world of online and Internet gaming is the game industry's Wild West right now. It's a huge, unchartered territory. No one knows for sure what risks or rewards await those who explore and conquer it, but there are plenty of people setting out on expeditions.

Even as Mpath's Mplayer service rolls on towards public release, and AOL's newly-acquired ImagiNation Network (bought from AT&T at a mere fraction of the price AT&T paid Sierra for it two years ago) gets a relaunch, other companies are launching some pretty ambitious Internet gaming plans with some pretty ambitious titles.

Two companies with megahits on their hands are Blizzard and Activision. Blizzard, in case you've been playing games on an Atari 2600 this past year, wowed everyone with *WarCraft II*, a real-time strategy game. Its latest games are *Diablo* and *StarCraft*, due later this year.

Diablo is a role playing game, and like Origin's *Crusader: No Remorse*, it offers an overhead, isometric view of the action in SVGA. Players pick a class from warrior, rogue, or sorcerer, and set off into the landscape. As a stand-alone game, *Diablo* is top-notch. The graphics are beautiful, and some of the scenes of gore — check out the Butcher's lair — are as creepy as anything in *Resident Evil*.

StarCraft is a new game, similar in concept to *WarCraft II* — a real time strategy game — but set in the far future. Humans and two alien races, the Protoss and Zurg all vie for cosmic supremacy. But the game is far more than *WarCraft II* in space — the graphic engine and AI have both been tweaked, and the three different races are all distinct: The Protoss use heavily armed and armored ships, which are slow to produce; the Zurg use the swarming strategy and can churn out weak units in quantity; Humans are somewhere in the middle, using familiar technologies of the genre, like powered battle armor and Mechs.

Play all three races and see the war from different, valid perspectives. Research technology, develop resources, and even undertake real-time *X-Com* or *Jagged Alliance*-style squad missions to rescue prisoners (as in the expansion disk for *WarCraft II*).

But what makes these games unique is not their great standalone play, or the almost de-rigeur LAN play, it's that these games will be playable over the Internet, for free. Blizzard's new web site, battle.net, will be an online place to meet and play opponents; Blizzard hopes that this added value will make the game even more desirable.

Activision is taking a similar tact with two games, *MechWarrior 2: Mercenaries*, and *Interstate '76*.

Mercenaries features more texture maps, improved AI, and a rigorous adherence to BattleTech specs. The game will look and play better than previous *Mech* games, and an element of resource management (a la the original *MechWarrior*) makes the game even more addicting.

Interstate '76 (see page 147) uses the *MechWarrior 2* 3D technology in a driving combat game.

Both games will ship with Internet drivers, to allow free play over the Internet. All players need is an ISP with Winsock compatibility, and you'll be able to run your Rakshasa against your friend's Timber Wolf, perhaps to be rudely interrupted by someone you've never met — and her Atlas. All you'll pay is your ISP subscription fee.

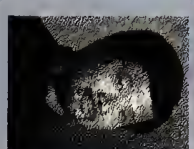
Game companies like EA think that 20% of their revenues will be derived from some online factor by the year 2000. So they're making their products Internet-ready today.

Now, Blizzard's battle.net and Activision's Internet play won't offer the same amenities as Mpath (like managed network traffic for the lowest latency, other supported games, a slick front end, and an instant gaming community) but, hey — it's free.

It'll be like network TV (for free) versus cable or pay-per-view for premium content. So if you don't mind the blemishes, it's a great time to play on the Internet. And as the industry gets its bearings in cyberspace, most of the new online gaming is free while in beta test stage. Even many games that were once only on commercial online services (like GEnie) are free for now. Let's hope it stays this way. ng

by Bernard Yee

Bernard Yee has contributed to *USA Today* and writes regularly for *PC Gamer*, *PC Magazine*, and has authored several books on gaming



Data stream

The number of handheld computers sold last year: **773,000**

Penguin Books' profit last year: **$51 million**

According to the book *Open Skies, Closed Minds*, by Nick Pope, the number of U.S. citizens who have taken out in insurance against alien abduction: **35,000**

Number of cigarettes smoked every day: **15 billion**

Time it would take the **Next Generation** team to smoke 15 billion cigarettes, given its current consumption level: **456,621 years**

Number of Porsche 911s that could be bought per day with this money, instead of cigarettes: **300,000**

Proportion of world population that could be fed and clothed per day with this money, instead of spending it on cigarettes: **100%**

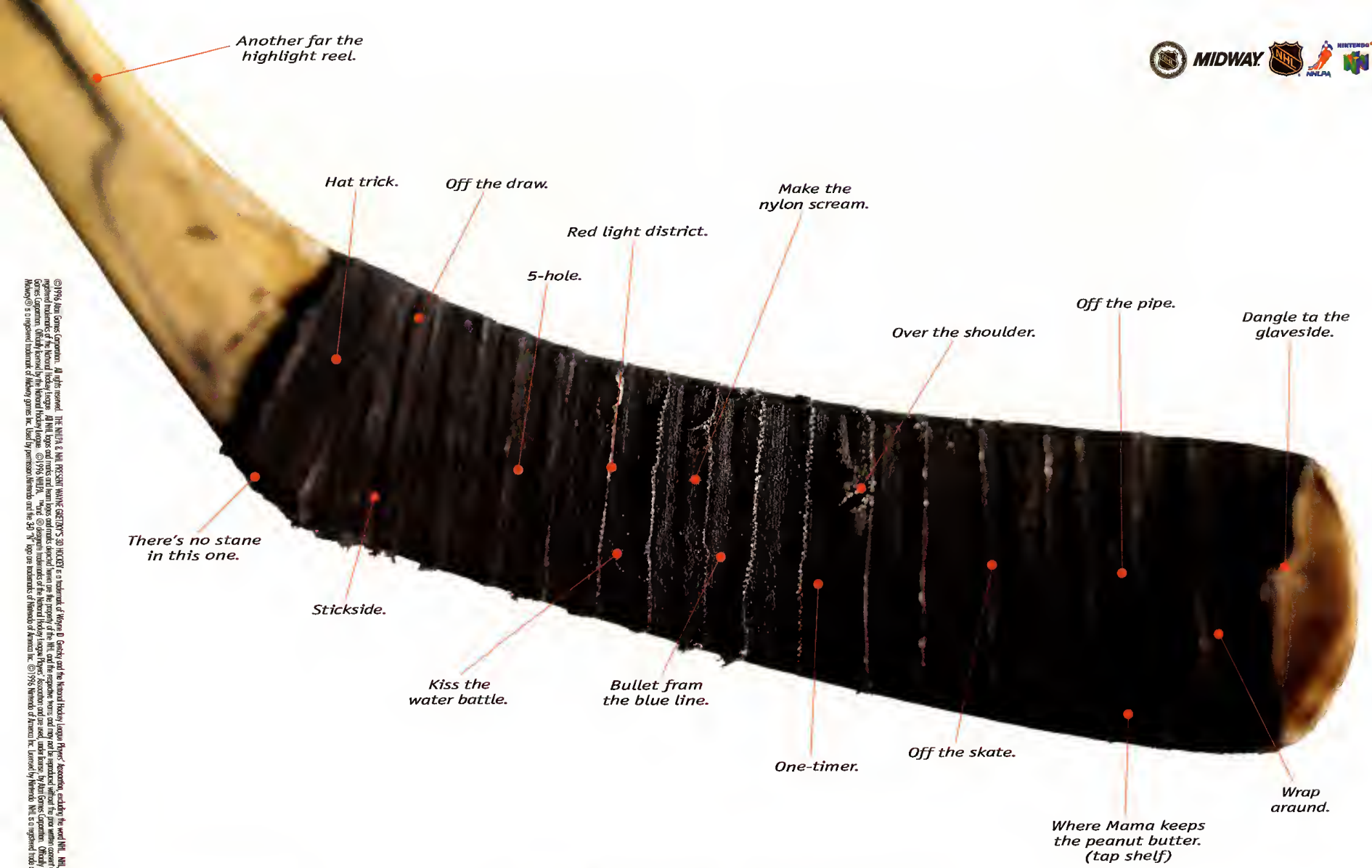
Number of Nintendo 64s sold in Japan after just nine weeks on sale: **800,000**

U.S. cost of cold war (1948 – 1991): **$12,800 billion**

According to the *Cosmopolitan Guide to Working in Retail*, the proportion of McDonald's junior management positions held by women: **31%**

Number of vacuum tubes in the U.S. War Department's 1946 Electronic Numerical Integrator — an early forerunner of the computer: **18,000**

Number of failed or surplus diskettes thrown away by computer users every day: **3 million**



MIDWAY

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Wayne puree. Wayne concentrate. Essence du Great One. Call it what you will, this game is 100% pure Gretzky. In 3-D no less. With Wayne's own moves, strategies, and thoughts digitized for future generations. So you can use Wayne's skills plus his brains as you play 3-on-3, 4-on-4, or 5-on-5 against the best in the NHL. It's not just the monster arcade hit coming home, it's the most realistic 3-D hockey game ever. The way Wayne really plays. Fast. Furious. And in 3-D. Amen.

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Datebook

October

The **7th Annual Fun Expo**, known as the layman's "Fun Center Show" because of its focus on small- to medium-sized Family Entertainment Centers (FECs) and Location-Based Entertainment Centers (LBECs), will be held at The Sands' Exposition and Convention Center, Las Vegas, NV, from October 9 to 12. Open to the trade only, not to the public. There will be more than 1,000 booths, amusement equipment, virtual reality equipment, arcade and redemption games, motion simulators, and more than 40 seminars on running FECs and LBECs. Call Rich Regan for booth information and or Bailey Beeken for questions conceming hotels (Treasure Island, Mirage, and Harrah's are offering special deals) or attendance information. Call (914) 933 9200, or FAX (914) 993 9210, or email at funexpo@aol.com.

November

IAPPA the **International Association of Amusements and Attractions**, is like a big arcade show except for the simulators, rides, and amusement attractions for which it's famous. Closed to the public, it is held from November 20 to 23 in New Orleans, LA, at the New Orleans Convention Center. Call (703) 236 4800 for more information or accommodation enquires.

Comdex will take place in Las Vegas, NV, November 17 to 21, and is open to the public. For more information, call (617) 449 6600.

Nintendo Corporate Limited's **Shoshinkai** will be the place for all the world game industry interested in finding out more about the 64DD add-on for Nintendo 64. It will also see the unveiling of *Zelda 64*, and whatever other software Nintendo manages to get ready in time. Not open to the public. For more information contact Nintendo at (213) 623 4200.

December

Fall Internet World will happen December 10 to 13 at the Javits Convention Center, NY. Call Mecklermedia at (203) 341 2855.

May

Multimedia 97 Exposition and Forum will take place May 6 to 9 at the Metropolitan Toronto Convention Center, Toronto, Canada. The show features five major components: Multimedia Communications; Virtual Reality World; VICOM; Showcase On Production, and Electronic Design. For more information telephone (905) 660 2491, or FAX (905) 660 2492, or email to moreinfo@multimedia.ca. Official WWW-site: http://multimedia.magic.ca

June

The one and only **Electronic Entertainment Exposition** (aka **E3**) kicks off in Atlanta on June 6. Open to the public for one day.

SHOW ORGANIZERS: If your show isn't listed here it's because we don't know about it. FAX us on (415) 468-4686; E-mail us at ngonline@imagine-inc.com; or write us at Date Book, **Next Generation**, 150 North Hill Drive, Brisbane, CA 94005. See? Easy

GADGET

Peripherals, accessories, gizmos, add-ons, thingies, and stuff

Presario 8712

Price: $3199
Manufacturer: Compaq
System: PC

In the past two months, Sony, NEC, and even IBM have announced new PC machines dedicated to high-end gaming. First up, however, is Compaq with its Presario 8000 line. We evaluated the 8712, a P200-based machine with 512k cache, 32MB EDO RAM, 3.8 GB hard drive, 8X CD-ROM, PowerVR 3D accelerator, Interwave sound card, 33.3Kbs modem, Presario 1725 17-inch monitor, JBL Premium Pro speakers with subwoofer, and a Thrustmaster Phazer game pad designed specifically for Compaq.

The system also boasts a number of "neat-o" features, like buttons for controlling the CD player right on the front of the machine, a volume control knob for the speakers located on the monitor, and even a "sleep" switch for powering down the system without having to shut it off.

There were some initial glitches with the Interwave sound card running under DOS, but updated drivers (which will ship with the final model) eliminated the problem. It benchmarked impressively, at least as well as other P200s, even 10% better than the old standby Gateway, and for the price you can't beat it. However, like many Compaqs, it's not terribly flexible. The SVGA adapter runs off the motherboard, so if 2MB VRAM isn't enough for you, you're apparently stuck — experiments with installing a beefier graphics card proved fruitless, as it continually tried to revert to the motherboard. Oepending on if, and how, you plan to upgrade in the future, you could find some of your options limited. The bottom line is that the 8712 is a serious piece of hardware, easy to use (support is excellent), more than competitively priced, and right out of the box, man, can it play games, but you get exactly what you pay for.

Game Guru

Price: $24.95
Manufacturer: 3DO
System: PC

There was a Game Guru for for the 3DO multiplayer, but now that The 3DO Company is spreading its wings into PC gaming, so why not make a Guru for PC?

For the most part, the Guru is a nigh-comprehensive database of codes and patches for hundreds of PC titles, which would make it a must-have in any case However, for the hard core game addict, the Guru also includes a programming module for digging out your own codes and patches. No serious gamer should be without one.

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http://www.next-generation.com

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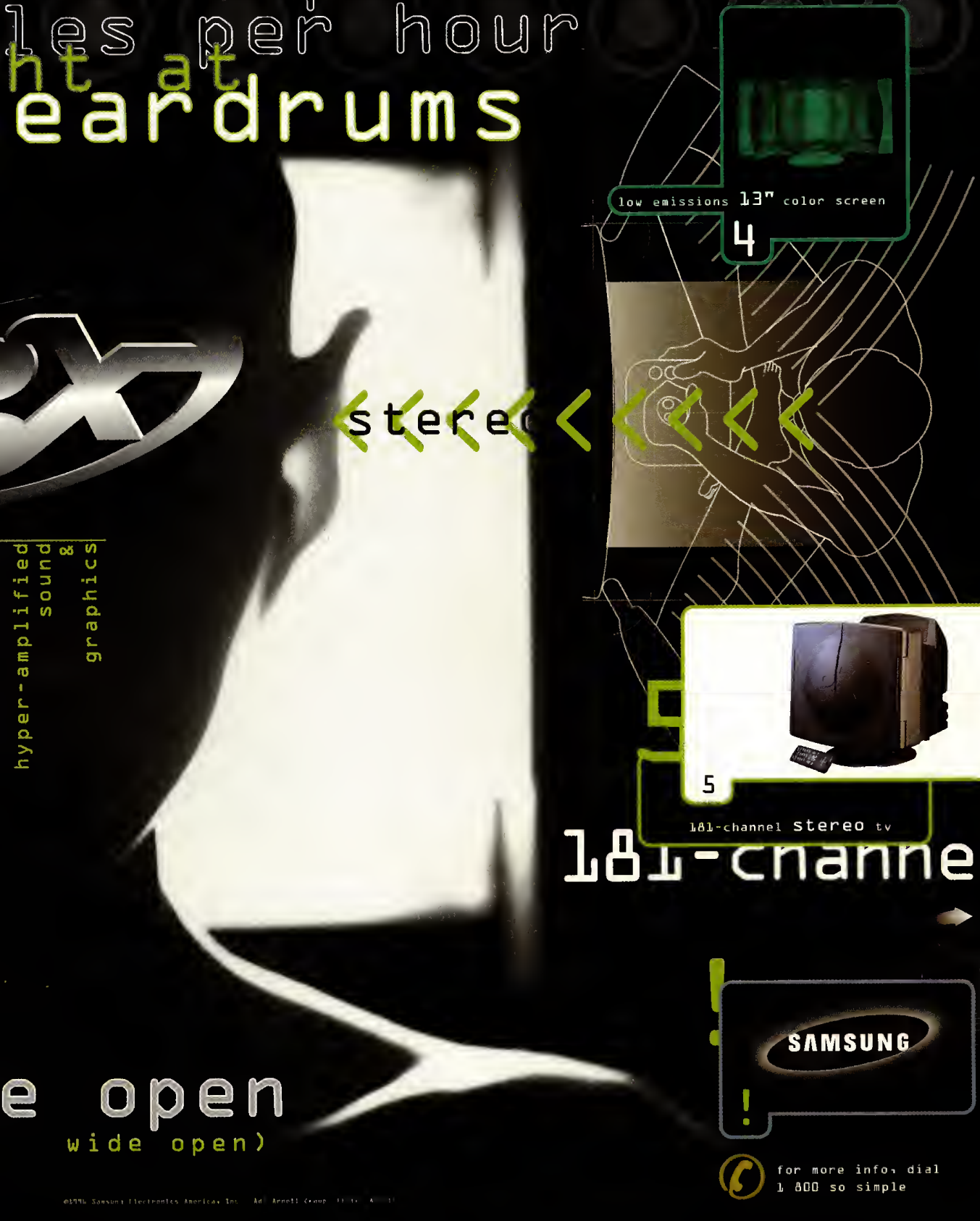

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Total Recall
the future of data storage

Without RAM, hard disks and CD-ROMs, the videogames of today would not exist. Next Generation documents the history of data storage, finds out why console manufacturers are cheating — yes, cheating — gameplayers, and predicts future developments

The Saturn's memory expansion slot enables future games to utilise extra ROM. So far, only SNK has taken advantage of this

When the ZX80 "home computer" was launched by U.K. inventor Clive Sinclair in 1979, the promotional material surrounding it suggested it was so powerful it could run a nuclear power station. In reality, it contained just 1K of RAM and used standard audio-cassette tape for auxiliary storage. Apple's Pippin, recently launched in Japan, will have 6Mb RAM and utilize now commonplace CD-ROMs containing up to 650Mb a disc for auxiliary storage. The Nintendo 64, meanwhile, is capable of shunting over 500Mb of data around its system per second and will have a read/writable magneto-optical drive. And in the PC market, gigabyte hard drives have fast become the norm.

However, none of these orders of magnitude improvements have yet managed to narrow the input/output (I/O) gap, and the real problem has become not crunching the numbers, but getting the numbers to the cruncher on time. This is a discrepancy resulting from storage technology improving at a slower rate than that of microprocessors.

In many ways, the computer industry is engaged in a race between two axioms: Moore's Law and Parkinson's Law of Data Storage.

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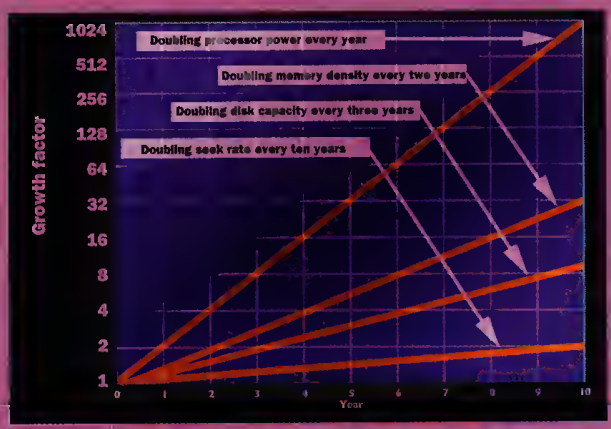
In the games industry the problem is compounded by a volatile market demanding ever-increasing graphic realism. The escalated use of 3D graphics has made bandwidth a real issue along with RAM size and the capacity of auxiliary storage. The difficulty comes in designing future platforms and, while the PC's architecture is largely (though messily) upgradeable, dedicated hardware manufacturers are really struggling to keep up.

The increased use of 3D graphics has made bandwidth a real issue in game development, along with RAM size and storage



This graph shows the hypothetical effects of dissimilar doubling rates over a decade. Clearly, advances in processor speeds exceed all other factors, merely perpetuating the disparities

Sega has already upgraded the Saturn's memory capability for specific games with a ROM expansion cartridge that plugs into the slot on top of the console. Nintendo, meanwhile, would probably like to have delayed news of the DD64

magneto-optical drive and certainly news of its RAM expansion packs for as long as possible.

"This is probably the biggest problem for a hardware manufacturer, as programmers are impossible to please," reckons Shiny Entertainment's Dave Perry. "So they make a stab in the dark hoping that they supply just enough RAM to get the job done — and this helps keep the price as low as possible. But the problem is that RAM upgrades offered down the road rarely work," Perry continues. "We cannot rely on everyone buying them unless they are fitted as standard from the beginning. There are exceptions to this rule, like the 16K RAM Pack for the ZX81, the release of the 48K Spectrum, and the slow move from 512K to 1Mb on the Amiga S00. But, basically, to really succeed a RAM expansion requires 'must-have' killer games that make everyone buy the RAM to play the game. That's why it's safer just to put the RAM in from scratch."

But RAM costs (DRAM is currently around $30 per Mb) and the price is notoriously volatile and almost impossible to predict, especially given the lengthy time for hardware development. Manufacturers have to try and anticipate the silicon market, riding a fine line between price and capability. And the amount of RAM can be the difference between a machine arriving at an attractive price point or not.

Toby Ferrand is in charge of M2's development in the U.S. and has definite, though perhaps slightly biased, opinions on the subject. "RAM size is of growing importance because users' expectations for quality, interactivity, and gameplay complexity are increasing rapidly," he explains. "The Sony PlayStation has 3.5Mb of memory and the Sega Saturn has 4.5Mb. For these machines, the limited amount of memory is definitely a key constraint for title development," Ferrand continues. "Since these machines aren't true 3D machines — they lack z-buffering, MIP-Mapping and hardware Gouraud shading — their memory is really sized to provide for adequate 2D performance. While Matsushita has not stated publicly how much memory is in M2, suffice it to say that it will be adequate for both 2D and 3D games."

Expect that to be 4Mb, an important figure when considering ports from the PC. Developers aiming for the PC market can pretty much assume the machine will have 4Mb RAM, and probably now 8Mb, mainly because Microsoft has those requirements for Windows and Windows 95. Developers — who en masse are capable of exerting tremendous influence on a platform's ultimate specification — always push for as much RAM and VRAM as they can get ("A gas will always expand to fill a room. Code will always expand to fill the RAM," comments Perry).

To really succeed a RAM "must-have" killer games that make everyone buy expansion requires the RAM to play the game

While the statistics may point to a vast increase in RAM over the past 15 years, Bullfrog's Peter Molyneux argues that in real terms levels have remained almost static. "As a console games developer the actual amount of RAM available hasn't really changed that much since the early days of the NES or Sega Master System, since so much more memory is needed for graphics and sound effects which seem to just gobble it up. So, at first, when you hear about a new console, you think, 'Oh wow, how amazing,' but once you take away all the memory you're going to need for those great graphics and fabulous sound effects, the net gain in memory is relatively small."

Molyneux illustrates this by

Matsushita's M2 has a unified memory system. Once one operation is finished, the memory used by that can be freed for another use

pointing out that in *Populous* a character took up 48 bytes while the characters in *Dungeon Keeper* require 2000 bytes. To keep up with these increasing demands for memory, the trick from the hardware side is to keep as much of the architecture as scalable as possible, enabling commitment to a final spec very late in the day, as was the case with both the PlayStation and the Saturn.

According to some, though, Nintendo's volte-face with the DD64 is an illustration of how badly it can all go wrong. One industry source, who wishes to remain anonymous, said:, "The DD64 is mainly necessary because Nintendo was let down by technology. It gambled in the design stages that the slow, high-density ROM needed for carts would be cheap enough by the time it launched. For various reasons the market didn't go as well as expected."

Nintendo underestimated the switch to CD-ROM within the development community, and thus, the need for more storage

Indeed, Nintendo's DD64 drive unit is currently at the hub of speculation and rumours that it won't be a standard magneto-optical drive, but rather some obscure hybrid of read-only and magnetic-writable media. Certainly, Nintendo underestimated the extent of the switch to CD-ROM within the development community and thus it now faces a need for more storage, but — apart from in Nintendo's own unique case — storage isn't really an issue for developers any more.

Both capacity and access time have increased drastically since the days of magnetic tape, handicapped as it was by having to search for data blocks sequentially.

In the PC market the steady diffusion of floating-head magnetic disk drives (often referred to by their informal generic name, Winchester) in which the read-write head planes over the disk surface on an air cushion, has taken access time down to 28 milliseconds and vastly bumped up domestic capacity. For games specifically, both 1.4Mb diskettes and ROM carts have found themselves being superseded by CD-ROM, which easily accommodates most data requirements at present. It's a trend set to continue with the imminent onset of DVD and its 4.7Gb capacity looming on the horizon. There is, however, a potential fly in the ointment.

DVD's passage from concept to standard hasn't been a particularly smooth one and the latest twist involves the Hollywood faction's insistence on regional coding. Hollywood can, at present, regulate the release of films on video in different territories indirectly via the NTSC/PAL standards, and its current push is to extend that control with the creation of eight distinct territories for DVD. While initially this might seem to only affect the DVD video market, the same discs are designed to play on DVD-

Digital Video Disc, while still seeking a final standard specification, offers a 4.7 gigabyte storage capacity on each disc. More FMV, then?

According to Peter Molyneux, modern games use RAM for graphics and sound, so gameplay still has to be squeezed into a small memory area

History of RAM

Though the giant ENIAC built at the University of Pennsylvania, using 18,000 vacuum tubes and covering 1,800 square feet of floor space, is widely considered to be the first modern computer, it wasn't until the theories of Hungarian mathematician John Von Neumann were implemented that computers became recognisable in a modern context. The Von Neumann architecture proposed that programs and data should be stored in a slow access storage medium and worked on in a fast access, volatile medium. Thus, the concept of RAM was born.

The first computer based on this architecture was EDVAC (Electronic Discrete Variable Automatic Computer) and, unlike ENIAC, returned to the system of binary notation that the pre-electronic computers had used. This enabled them to use mercury delay lines, a memory system based on simple on/off switches. An electronic pulse was "trapped" in a tube of mercury and could therefore be retrieved at will. Typically, a sensed pulse yielded a "0" and no pulse "1."

The second generation of computers moved on to using ferrite core memory, a system using magnetic loop toroids first proposed by Jay Forrester in 1950. A 3D array of toroids was constructed with each row and column having a common wire running through its centre. When data from a certain address was required, at the intersection of horizontal and vertical wires current would pass a threshold level and remenance (the residual magnetic flux) would be switched. This would be detected via a characteristic signal in a sense line and, depending on the polarity of the original magnetic field, a "0" or a "1" detected. However, even though it was non-volatile and the toroids would stay magnetised until read, it was a destructive readout and the memory cell had to be rewritten after every sensing.

Core memory was still being used in the early seventies but the advent of CMOS' semiconductor technology made it rapidly obsolete. The first commercially available dynamic random access memory (DRAM) chip, the Intel 1103, was introduced and DRAM's dominance was rapidly established.

Coupling low production cost, a small memory cell and low power consumption, DRAM still has a commanding share of the current RAM market. Consisting of a single transistor and a capacitor, a bit is stored in the capacitor as a charge (typically five volts for "1" and zero volts for "0") which can be read when capacitor discharge is triggered by accessing the transistor at the memory address. Again this is a destructive process and the data has to be rewritten, but DRAM is additionally handicapped by leakage from the capacitor. Therefore all rows have to be periodically read, sensed and rewritten with most DRAMs since 1970 refreshing a single row every 15.625 microseconds.

With density quadrupling every three year generation, the structure of the memory cell itself has remained unchanged. There are many different varieties, though, which have modified the way RAM chips interface with the main system. EDO-RAM, effective in systems such as the Pentium, leads to a 20% performance increase; and Video RAM, with an additional long shift register, enables parallel operation with the normal interface and therefore simultaneous reading/writing.

Static RAM (SRAM), which overcomes the capacitor leakage problem by using cross-coupled inverters, is still volatile, but has the advantage that the lack of a refresh cycle leads to greatly increased performance due to the overall decrease in cycle time. The necessity for more components leads to a higher cost and a quadrupled size of cell, both of which have limited SRAM usage to small areas where their speed is vital, such as on-chip caches.

The Nintendo 64, shifting over 500Mb of data per second, doesn't segment RAM, meaning memory restrictions are less of a problem

hen the ZX80 "home computer" was launched by U.K. inventor Clive Sinclair in 1979, the promotional material surrounding it suggested it was so powerful it could run a nuclear power station. In reality, it contained just 1K of RAM and used standard audio-cassette tape for auxiliary storage. Apple's Pippin, recently launched in Japan, will have 6Mb RAM and utilize now commonplace CD-ROMs containing up to 650Mb a disc for auxiliary storage. The Nintendo 64, meanwhile, is capable of shunting over 500Mb of data around its system per second and will have a read/writable magneto-optical drive. And in the PC market, gigabyte hard drives have fast become the norm.

However, none of these orders of magnitude improvements have yet managed to narrow the input/output (I/O) gap, and the real problem has become not crunching the numbers, but getting the numbers to the cruncher on time. This is a discrepancy resulting from storage technology improving at a slower rate than that of microprocessors.

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you can shift memory around," Hinsley argues. "Solutions are better caches, faster RAM, paged RAM, new RAM technologies — banked split access RAMs and so forth. But most game programmers will just live with what they're given and find the best way to take advantage of each console's memory system. Personally," Hinsley concludes, "I think a unified large-cache RAMBUS-style approach is the best. All this mucking about with separate areas of memory for the sprite screen, the background screen, textures, the game code, etc, is a real pain in the ass."

All this mucking about with separate areas of memory for the sprite screen, background screen, textures, game code, etc, is just a pain in the arse

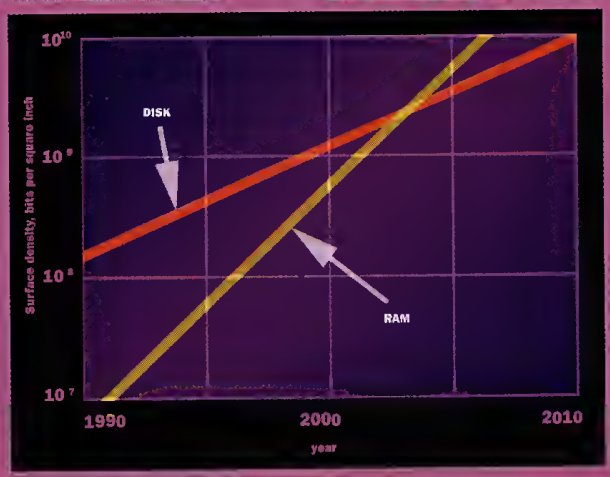
In designing the hardware architecture, there are two basic routes that can be followed in an attempt to solve the bandwidth problem. The first, and most popular amongst the current crop of consoles, is to dedicate multiple slow memories to specific tasks. This is not only easy to design, but also can be implemented with older, proven RAM technologies. It has disadvantages, though.

3DO's Toby Ferrand: "There are several disadvantages. First, a distributed memory architecture is not very flexible. If a half-megabyte of memory is dedicated to audio, for example, and if a title doesn't actually need that much memory for audio, then effectively the machine has less useful memory than the specifications would imply. A second problem is that as DRAM densities increase, the distributed memory architecture can't take advantage of the latest, cheapest memory," Ferrand continues. "Today, the cheapest memory comes in 16Mb chips. So if you have a half-megabyte of memory dedicated to audio, that memory must always be implemented with the less dense, more expensive memory. Finally, there are occasions where one process or another — 3D graphics for example — could benefit from the maximum possible memory bandwidth. If the aggregate memory bandwidth of a system like the PlayStation is, say, 100Mb/sec, but a substantial portion of that bandwidth is dedicated to audio and another portion to the CPU, then at any one time the graphics-rendering engine might be limited to no more than a few tens of megabytes per second. This inherently becomes the bottleneck for the system."

The current trend now, with both the M2 and N64, is back towards a unified memory system. M2's unified memory uses 16Mbit SDRAM chips which, according to Ferrand, give the machine an aggregate bandwidth of over 500Mb/sec, meaning that if the software running suddenly needs memory for a certain subroutine, it should be there. Conversely, memory doesn't have to be left idle.

"If a title needs 2Mb for audio, it can have it, or if none is needed then the memory is completely freed up for other tasks at the discretion of the title programmer" says Ferrand. "When MPEG is being decompressed by M2, then a few hundred kilobytes of memory are allocated. When the MPEG sequence finishes, the memory is freed up and can be used for textures or anything else the programmer wants. Such an architecture enables the use of the cheapest memory, provides the best memory bandwidth, and is the most flexible for the developer to use."

Bullfrog's Molyneux also argues the case for unified memory: "Potentially we don't have to worry about different areas of memory running at different speeds, and theoretically if we, say, needed more memory for sound than graphics, we could do it. As developers it means we are less constrained by the



A comparison of RAM technology and disk technology. By the year 2003, RAM will be a more efficient method of storage than hard disks — at least, this is the current prediction

system's architecture."

Chris Hinsley: "Separate areas are just a bloody pain. You can have more textures, double-buffered screen building and loads more besides if you have a single main RAM area, and the custom graphics chips can access all of it, both for screen, drawing and data storage functions. Just have a single area of general-purpose RAM and stick a sodding great cache on all the chips that read from it — lovely."

If forthcoming machines are going to rectify the problem in the console market, for the PC it's a different matter. Video bandwidth has been a huge drawback and while video cards have eased the problem somewhat, the arrival of 3D-accelerated consoles has resurrected it again for anyone designing cross-platform software.

Peter Molyneux: "The bandwidth constraints presented by the PC are both good and bad. As PC architecture has evolved over the past 15 years it is very, very familiar, but chips manufactured for the base architecture must be conservative — hardware and graphics accelerators all have different ways of optimising access and so must be dealt with by us. Win95 has tried to establish an interface standard with DirectX, but it's a Herculean task and will take time to perfect."

Dave Perry is less understanding. "The PC is really messy inside. Hopefully when Microsoft controls the planet it will release a new PC with a new, 'clean' architecture. This will dramatically drop the price of all of the fixes that companies are having to create to keep moving forward."

Until then, though, fixes will be what is required, and the latest of them to excite interest is NEC and VideoLogic's PowerVR chipset. Targeted from the beginning at reducing both memory requirement and memory bandwidth requirement, it dispenses with conventional z-buffering and handles hidden surface removal through its own Image Synthesis Processor (ISP). It also contains an integral texture and shading processor that only deals with visible pixels, reducing memory traffic, so VideoLogic claims, by between three and ten times.

The drawbacks are that it relies on the host CPU as a geometry transformation engine (GTE) and it will thus only realistically achieve improved performance on a P150 upwards. Also, the ISP chips are expensive.

Chris Hinsley, in particular, is sceptical. "I don't believe that boards like the VideoLogic or others really help," he argues, "other than to allow acceleration of drawing polygons — providing, that is, you have enough texture RAM on the graphics card. Again I don't like this approach of having a separate area of memory for the textures and so on. I believe Apple has got it right with its QuickDraw 3D Accelerator Card. It can have the screen and textures in main PCI memory and can freely draw from and to any address region."

According to a NASA research document on storage technology in the 21st century, there are three important trends to consider in the future development of the field. The first is the negative effect the I/O gap has had on computer evolution. Another is that magnetic storage has, despite predictions to the contrary, been able to keep pace with optical storage. The third is that solid-state storage media are approaching the density and even the cost of the magnetic ones.

It's highly likely that the future of storage lies in RAM, with a price and capacity similar to current hard discs, though with the advantage of a

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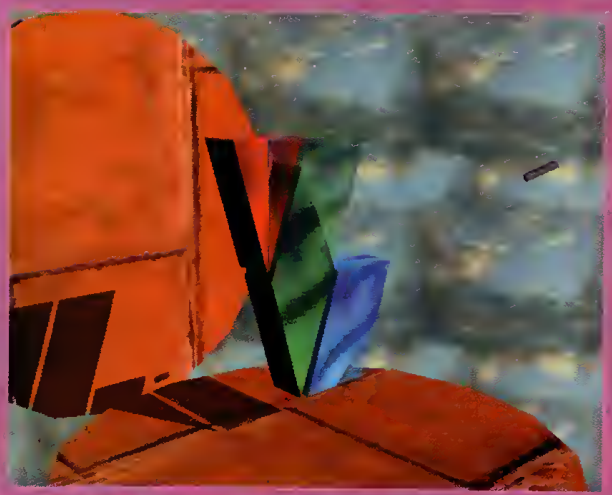
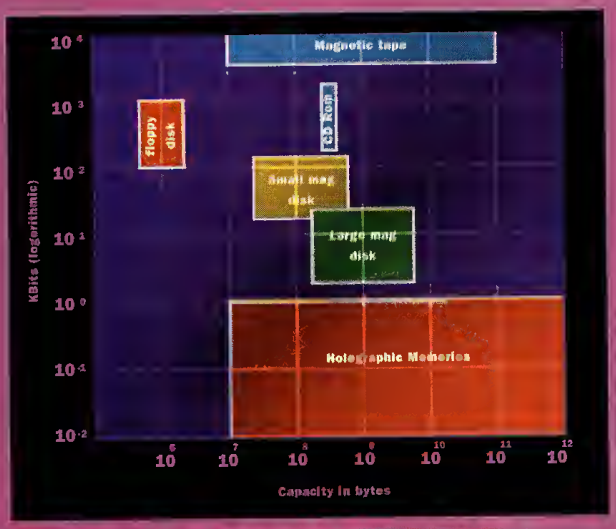


VideoLogic's PowerVR 3D accelerator card dispenses with conventional z-buffering and handles hidden-surface removal itself



A comparison of secondary storage technologies. Note how holographic memory can store the most data and is also the quickest to access — coming to game machines soon?

much faster access time. Current projections estimate that 1Gb RAM chips will be a reality by the start of the next century, but the immediate future is likely to be one of incremental improvements to both the standard PC specification and the next generations of consoles.

DVD, despite its current difficulties, is a certainty. "DVD will be the next big step," says Perry. "Mass storage on a CD-ROM which is already 'user friendly' and accepted cannot fail."

Elsewhere, simply extrapolating from current trends leads to the conclusion that more RAM and improved 3D graphics cards for the PC will soon become the norm. Peter Molyneux points out that, at current rates, by the year 2000 the base-spec RAM for the PC will be 32Mb, and Hinsley predicts an industry-wide move to a single RAM area. Meanwhile, RAMBUS, as implemented in the N64, which interface RAM directly to the CPU and eliminate the need for caches, show much promise and potential.

While the I/O gap is expected to shrink rapidly, the technology is developing fast. Indeed, in the one area of memory in which development is probably accelerating, the unfortunate corollary is that redundancy is too. "Faster, more bits, all that good stuff..." Perry forecasts, " are also more reasons to feel bad about your purchase six months or so down the line...

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Future developments

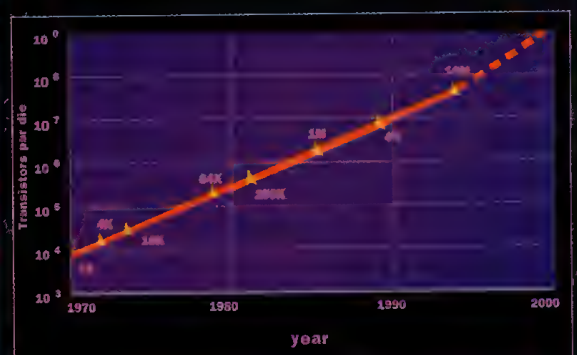
The future of memory storage beyond the next ten years is a cloudy one. While the proposed introduction of hard discs utilising giant magneto-restistance by the end of the century might take data density from the current maximum of 75Mb/square centimetre to 1.5Gb/square centimetre, current predictions hold that solid state memory technology will eventually start to take over from the more traditional moving media.

RAM storage density averages a 60% improvement each year and while that parallels the growth in density of CPUs, the speed has lagged way behind. The fastest RAM chips, SRAM, have only improved at 40% per year while the more widespread ORAM chips have improved at an even slower rate. Main memory performance, in fact, has only been able to keep in sight of CPU development due to the use of SRAM cache memory operating as a temporary high-speed buffer in front of a larger but slower DRAM array.

However, RAM is still much faster than any current moving media and the development of silicon carbide semiconductors might speed it up further. Able to tolerate higher temperatures than current DRAM and therefore operate at higher clock speeds, individual cells can also be made three times smaller, and current leakage 10,000 times less. Other techniques also under investigation include magneto-resistive RAM and ferro-electric RAM, where the conventional DRAM capacitor is replaced with a 'leakproof' one, thus elimmating the need for a refresh cycle.

Away from RAM there is a bewildering array of different technologies being developed as future storage media ranging from molecular biological devices (where the switching speeds for molecular gates are in the region of three picoseconds) and spectral hole burning (which produces tell-tale features in the fluorescence spectra of a storage media) to the use of scanning, tunnelling microscopes to pit a conducting media with pit spacing being measured on the atomic scale and therefore providing an extremely high storage density.

Holographic memory, though, where information is stored by recording wave interference patterns, is the technology with probably the most immediate potential. Two separately focused laser beams are intersected within a storage media with the first beam containing the image. The second beam produces an interference pattern which is recorded by the media and shining this reference beam alone retrieves the data from that location. It's advantages are speed, potential high density and the facility for both parallel search and retrieval. It's only a matter of time until it is incorporated in a videogame system.



By the year 2000 the density of dynamic RAM (DRAM) should be around the 1Gb mark. Which can only be good news for gamers

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Art: Nicola Hartley

Artificial Life

Games that actually *live*? Computers that learn from their mistakes? Digital creatures that reproduce? **Next Generation** finds life, but not as we know it...

The most important advance in gameplay over the next ten years will not be in graphics or processing power — it will be in how computer-controlled enemies, allies, environments, and more behave. The technology that will be bringing these advances? Artificial life.

The appeal of *Maria* is not the ability to make a cutesy plumber jump on the head of cutesy bad guys. No, it is the feeling of exploration, of discovering the unknown that makes *Maria*'s adventures so successful. The real thrill of *Quake* or *Duke Nukem* comes not from fighting wave upon wave of similar acting demons, but from killing unpredictably-acting, human opponents. Solving an adventure game is only fun the first time — because after that, you know what to expect.

Now imagine a technology that promises to add a previously unknown degree of customization and unpredictability to video and computer games, with worlds as in-depth and complex as our own, enemies whose patterns cannot be memorized because they're always changing, and RPG characters that act as real as you.

Welcome to the world promised by a relatively new technology known as Artificial life (otherwise known as AL).

But before we begin to look at the immense possibilities for games presented by Artificial Life, it is important to have a grasp of its better-known predecessor, artificial intelligence (AI). AI in an academic sense is, according to Marvin Minsky (as quoted in Margaret Boden's book, *Artificial Intelligence and Natural Man*), "the science of making machines do things that would require intelligence if done by men." In games, AI is usually the code routines that computer-controlled enemies follow during a game in their attempt to act like a human-controlled, or otherwise "intelligent" character.

Much has been made of recent attempts to increase the complexity and depth of game AI (**NG 11**; also available on *Next Generation Online*), but what may actually be more exciting to gamers is not advances in AI, but rather the rise of Artificial Life as a means of empowering computer-controlled players.

So what's the difference between AI and AL? Despite the similarities in name, the two are dramatically different in nature. AI attempts to mimic intelligence by using a "top down," reductionist approach — the computer program attempts to reduce the possible reactions of an intelligent being to a series of rules. An input is received — for example, a command to "attack" — and then run through what may be an incredibly complex series of rules ("if enemy is within certain distance, move towards enemy," or "if enemy is firing weapon, start firing own weapon," for example).

Anark's Galapagos

Anark knows all about artificial life. Its first game is *Galapagos*, in which players must breed a new type hero

Anark's *Galapagos* is not only an example of leading edge artificial life technology, it is also one of the most impressive new game concepts Next Generation has seen.

Basically, *Galapagos* is a puzzle/action game in which players need to guide a character, Mendel, through a series of levels filled with various dangers — lava pools, lasers, pits, knives, and so on.

What makes the game unique is that Mendel is a fully realized Artificial Life construct. The technology that controls Mendel is called NERM (Non-stationary Entropic Reduction Mapping). Enabling self-organizing mappings between inputs and outputs, NERM is a technology that is comparable in its results to a neural network or genetic algorithms (although the actual technology behind NERM is a trade secret, which Anark is unwilling to discuss).

NERM is actually quite different from more traditional artificial life approaches, as Anark's Steve Collins explains: "Neural networks have a number of limitations that NERM controllers overcome. For example, neural networks are primarily limited to mappings that are one-to-one: In other words, for any given set of inputs for any time there is a single set of outputs. But with NERMS," Collins reveals, "you can create much much more complex mapping between inputs and outputs."

This gives NERM-controlled Mendel a greater range of possibilities than a neural-network controlled system.

The NERM technology could (and if Anark's plans reach fruition, will) be applied to any number of problems that require complex solutions. For example, it could be used to control the fuel injector of a car to always provide the optimum stream of fuel for a given situation, or let the stop-light grid of a city arrange itself into the pattern that enables traffic to flow the smoothest.

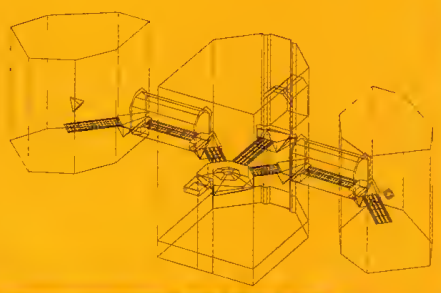
So how does NERM work with Mendel and *Galapagos*? Mendel can sense two things, infrared light and acoustics, which are the inputs for his NERM controllers. The outputs are to simulated servo-motors which can then produce realistic body movements.

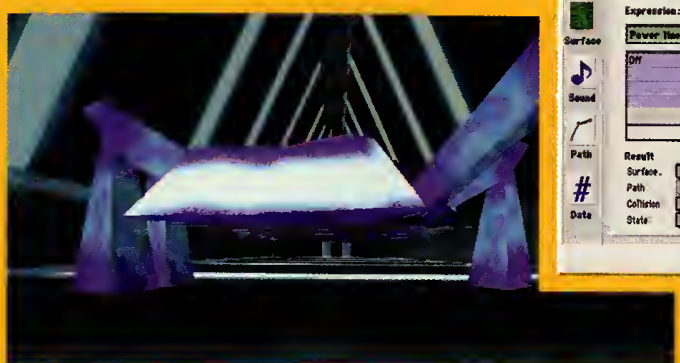
ANARK

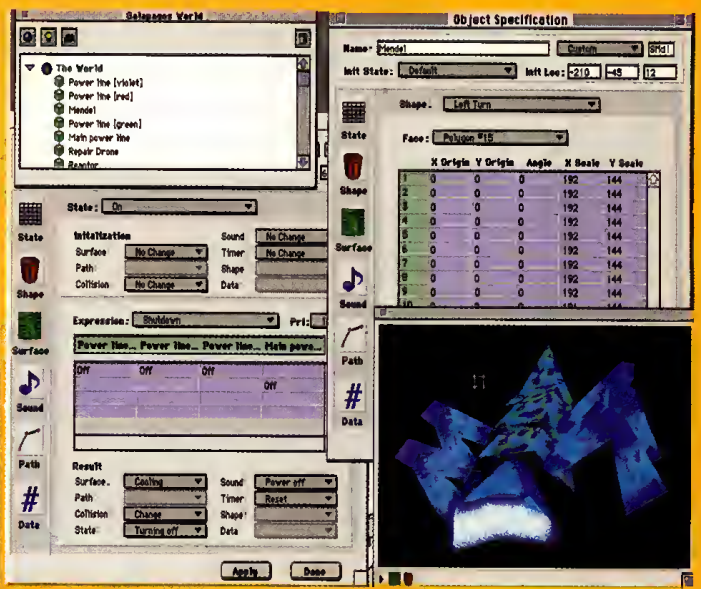
Continues Collins, "all the things that Mendel does are totally a product of those NERM controllers and how they organize the data they receive. What you get out of that is a creature that acts and learns and moves like a real thing."

When the game starts, Mendel is totally helpless — he can't even walk until the NERM controllers organize to the point that he learns how to use his legs. The only thing he has is an awareness that death is a bad thing. The user must then attempt to guide Mendel through the world, teaching him the rules of survival along the way. For example, if Mendel was walking towards a cliff, you could let him fall off. This would reset the level and give you a new version of Mendel that was more adverse to walking off cliffs. Or, as he approached the cliff, you could yell "No!" (assuming you have a microphone attached to your Mac or PC), and he would turn away, again with a new aversion to walking towards cliffs. Or maybe he walked away from the cliff to begin with, and you yelled at him till he jumped off — that would reset the level and give you a new version of Mendel that was less likely to walk off cliffs — and less likely to listen to you.

The look of the game is futuristic and largely abstract, which was entirely





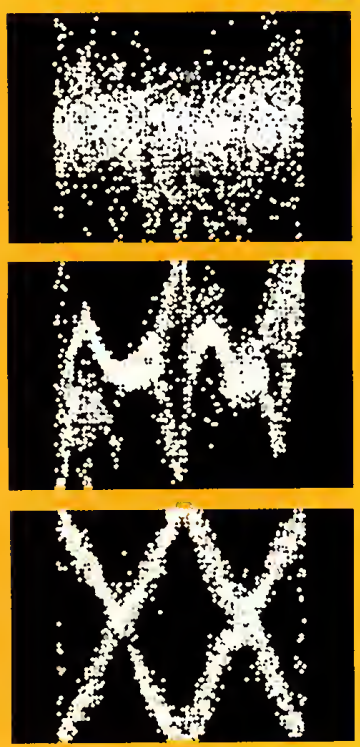


Anark's Leveller tool (above) aids in the easy creation of levels (above left) and 3D characters. Mendel, the main character of the game (left), looks quite a bit like a synthetic cockroach

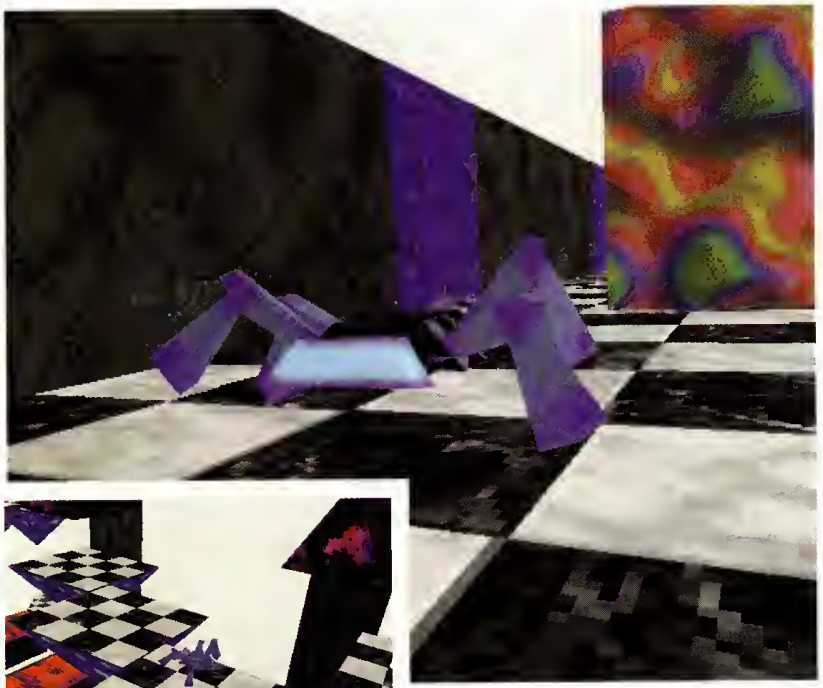
intentional on the part of the designers at Anark — one of the gameplay elements is figuring out exactly how each game world works. Mendel himself is also fairly unfamiliar looking, which, again, was intentional. The designers felt that if they made Mendel look too much like an actual animal, a cat or a gerbil, say, people would have too many pre-conceptions about how he should act and what he would be capable of.

And the gameplay? "In the game the excitement is to figure out how these Escher-like worlds work," says Collins, "while this completely autonomous creature, who has no idea you exist, goes about his life. He is totally unpredictable in that he obeys his own laws — not like the monsters in *Doom*."

Collins continues: "What you end up doing is trying to psychoanalyze what he is going to do in a given scenario. It's a new genre of extremely subtle gameplay." Next Generation agrees, and won't be surprised if in years to come, Galapagos is remembered with the same reverence as *Pong*... ng



A graphic representation of a NERM controller from chaos (top) to a solution with multiple outputs per input (above)



Galapagos sports futuristic worlds with an '80s new-wave style. The 3D engine is robust, but what impresses most is Mendel's "brain"

By applying the rules to the input, output is generated. Any complex AI system has to attempt to allow for every possible input in a system — a task few are up to, except in limited, toy worlds (like games). Even then, AI systems almost never act as intelligently as the humans they are attempting to mimic and are often given to extremely repetitive behavior patterns that can eventually be discerned and then beaten by human players.

Artificial Life systems start with a simple set of rules and allows complex, organic-seeming behavior to emerge from them.

Artificial Life, on the other hand, takes a radically different "bottom-up," constructionist approach. Instead of starting with a massive series of rules, Artificial Life systems start with a simple set of rules with a view to complex, organic-seeming behavior emerging from them. The immediate advantage of this approach is that because the interactions of even simple rules in simple systems can lead to exceedingly complex behavior patterns, it is generally impossible to use a reductionist approach (artificial intelligence) when trying to create organic-seeming systems on a computer.

But the difference between AI and Artificial Life is more than one of approach. While an immensely successful AI system might act truly intelligent, it could do so without ever seeming "alive" or mimicking the behavior of a living creature. An equally successful Artificial Life system, however, might display the exceptionally complex, organic behavior of a living organism without ever displaying, or possessing, the intelligence of anything much advanced beyond a virus, or possibly in the near future, an ant.

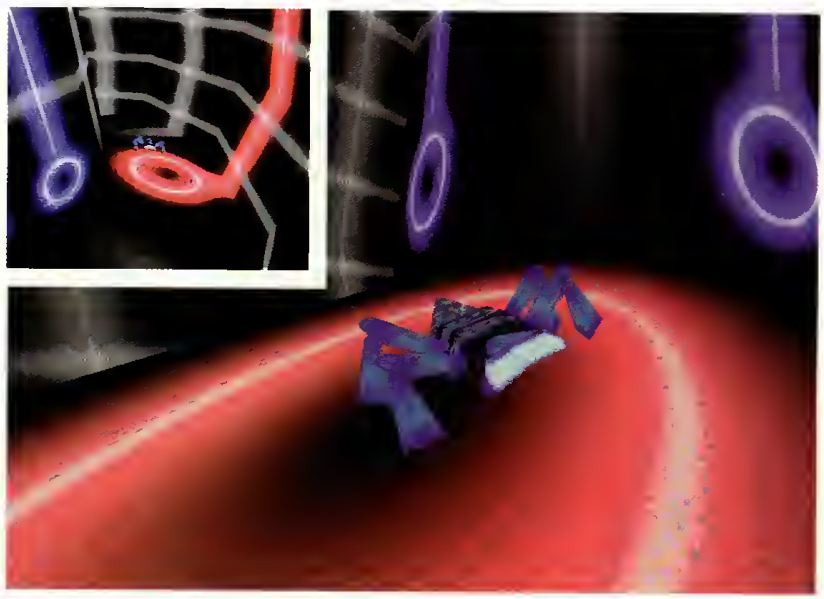
The difference between AI and AL is the same as the difference between "giving a man a fish (and feeding him for a day), and *teaching* a man to fish (and feeding him for a lifetime)." Except that, of course, as this early stage of Artificial Life's development, we haven't got near the river yet, let alone dangled a line in.

Few researchers would claim that Artificial Life organisms are truly alive, but

the best ones exhibit the same sort of complex behaviors found in naturally occurring organisms and give scientists (and game developers) a relatively easy way to examine the complex interactions found in living systems.

Although AL as a science is only about 10 years old, the first serious demonstrations of complex, organic-seeming behavior in a game came in 1968 with John Conway's landmark game, *Life*. *Life* is grid of cells that can be either on (black) or off (white). The state of a given cell is determined by that of its eight neighboring cells. If a cell has less than two neighbors alive, it will be dead (of "exposure") in the next round. If it has three or four alive neighbors, it will stay alive. If it has more than four, it will die of "overcrowding." If it is dead, and it has exactly three live neighbors, it will come to life in the next generation. Although very simple, populating the set-up screen with various patterns can eventually — after the program has had a chance to run through many rounds — breed a state of equilibrium in which the cell population seems to be self-sustaining, and the resulting pattern often mimics one of the recurring patterns seen in natural life.

Despite the name, *Life* is not alive — it's not even what we would consider today to be Artificial Life. It's a cellular autonoma (CA), a construct invented by John Von Neumann (with help from mathematician Stanislaw Ulam), whose vision of a complex, self-replicating CA that was also a Turing machine (what we know of today as a computer), was the first predecessor to all future Artificial Life work. The most important thing about *Life* was not simply that it existed and created complex, organic-seeming results, but rather that it did it with such simple rules (Von Neumann's CA had nearly five dozen cell states and pages of rules).



Anerk's *Galapagos* stars Mendal (and yas, Anark assuras us that it is a ha). It is indicativa of tha complexity of artificial lifa that such low-laval "organisms" raprasant the stata of the art

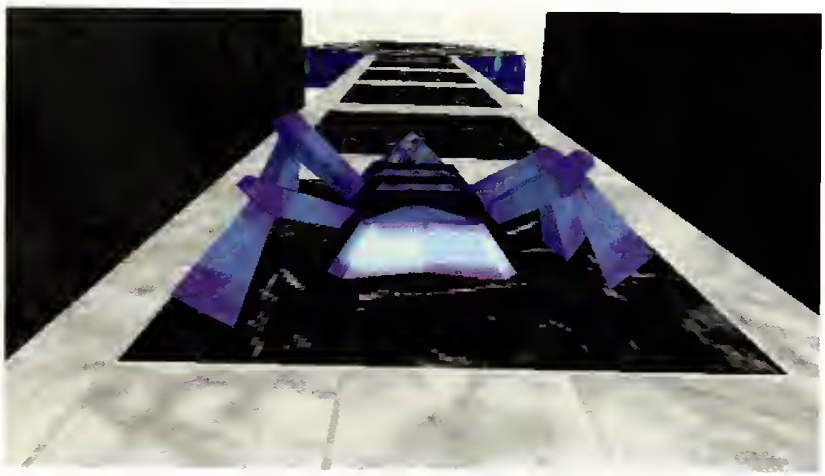
The rules that governed *Life* could be used to create an (albeit unwieldy) Turing machine, too. It is equally important to realize is that *Life*, and other CAs, are not simulations of a complex system; they are complex systems in their own right, and it is sometimes hard to believe that CAs, which generate such life-like results, are not somehow truly reflecting the processes which occur in nature.

"Artificial life as a paradigm is being grossly overused. It's just a popular term"

Steve Collins, Anark, Creators of *Galapagos*

Despite the promise of CAs, research into them was extremely limited until the mid-1970s when cheap, powerful (for the time) computers enabled many people to create CA and rule-based programs that had previously been possible only as hypothetical experiments. Creating working versions of Von Neumann's self-replicating computer, realistic-seeming models of bird-flocking behavior, and virtual ants, a small core of researchers pressed the science forward. Although the entire story is beyond the scope of this article (see Essential Reading on page 59) for more information), by the mid 1980s, a true science for creating Artificial Life had developed, using such techniques as neural networks and genetic algorithms.

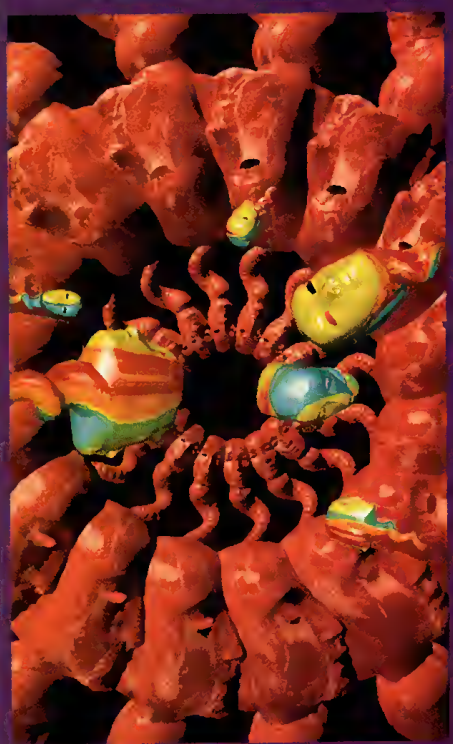
Neural networks operate and "learn" from their environment similarly to the way biological neural networks — brains — do. In genetic algorithms, multiple algorithms are tried for solving a problem, and the algorithms which work best are



***Galapagos* incorporatas a number of diffarant camera anglas, many of which ara user selactabla. In fact, using tha correct camara angla is assential to solving soma puzzlas**

Computer Artworks

The principles behind artificial life are already extensively used in the creation of graphics and art



William Latham's company, Computer Artworks, uses artificiel life routines in its Mutator Engine (left). Genetic modeling algorithms are incorporated in the Engine code to provide the 3D models with organic cheracteristics. The compeny's attempts at breeding artificial lifeforms ere extremely interesting to observe (breeding mutation, top left) end resemble the orgenic ertwork of Alien designer, HR Giger. Its Organic Art screensaver mutates and 'breeds' in realtime (above right). Greet art, but will anyone be able to make e game out of it? Computer Artworks hopes so

William Latham's Computer Artworks is busily engaged in turning its genetically modeled Mutator engine into the basis of a computer game. According to Latham, "Computer Artworks can now be thought of as a games developer," rather than just a producer of pretty works of digital art. The reason for this is that Latham and his colleagues are grappling with the intricacies of creating a full-blown Artificial Life computer game. The game will be based on Computer Artworks' Mutator Engine, which uses genetic modeling not to create digital organisms but to create new shapes and forms with an oddly organic look.

Like the Artificial Life engines behind *Creatures* or *Galapagos*, Computer Artworks' Mutator Engine can be used for all manner of other applications (financial analysis, for example) but Latham, who is essentially an artist, is more concerned with using it for exercises such as predicting the shape of the house of the future. It is likely, therefore, that any game based on the Mutator Engine will be angled more towards creating strange, futuristic worlds rather than creatures which socially interact.

At the time of writing, Computer Artworks has embarked on a pilot scheme for the game which will be ready for delivery next March, by which time Latham hopes that the initial interest shown by game publishers has not waned.

ng

Millenium Interactive

A new race of, erm, "Norns" are about to be unleashed on the world. Will they thrive and prosper? Game players are invited to find out themselves...

Millenium's *Creatures* is certainly cuter than *Galapagos*, and it takes place on a 2D plane. Players can track the strain of their Norns through the generations (above), as well as providing them with balls and other playthings to keep them interested. Is *Creatures* the ultimate version of *Little Computer People*? Time will tell, but the game is certainly as fascinating to watch. And these little computer organisms have the capability to learn, grow and evolve. (But don't get too attached — the Norns have a 40 hour life span)

One of the leading developers, along with Anark, in consumer level Artificial Life is Cambridge, U.K.-based Millennium Interactive, whose soon-to-be-released *Creatures* game for the PC will be the one of first readily available, tangible manifestation of Artificial Life. The world of games, previously home to all that is frivolous and justified by nothing more sophisticated than pure, unadulterated entertainment value, has, through Artificial Life, made an evolutionary jump into a scientific test-bed.

Millennium's interest in Artificial Life grew from a project undertaken by *Creature*'s chief architect, Steve Grand, involving connecting a neural network up to a grid of flashing lights, rather than a computer screen. The company took an overall interest in the technology, but before sinking money into it, had to be sure of some sort of financial return, so it took the obvious step of turning the technology into a computer game.

If *Creatures* hits, this will pay off. According to Millennium's Michael Hayward, "The next stage is to develop partnerships, which would enable us to exploit the underlying technology of *Creatures* before anyone else does." But so much attention has surrounded the game, and indeed, the game itself is looking so compelling (it is in the final stages of debugging at the time of writing) that it may be some time before Millennium is able to explore the possibilities of its Artificial Life engine.

On paper, these possibilities are astounding. By digitally modeling organic life processes, such as a genome set (which, like all sets of genes, can handle a level of mutation) which governs digitally modeled versions of the chemical reactions which take place in the bodies of living organisms, and a brain whose synapses connect according to external stimuli much as in a living organism, Millennium believes it has created a system which, in Michael Hayward's words, "Is like a heterogeneous neural network that modifies itself, without anyone having to say yes or no to it." Millennium is hoping that, when applied to its digital "Norns" (*Creatures*', erm, creatures), it will enable the Norns to develop organic instincts for survival and self-propagation. And this looks to be an attainable aim.

Millennium's Toby Simpson is excited by the behavior exhibited by one Norn during the final fine-tuning exercise devised by Millennium, aimed at breeding Norns with interesting behavior patterns: "One of the Norns worked out all by itself that if it picked up eggs and threw them in the incubator, out would pop a friend. So it spent a lot of time scouring its habitat for eggs.

This was unbeknown to my colleague who went to lunch and got back to find a room full of Norns squabbling with each other. He couldn't work out where they came from until the first Norn brought another egg into the room."

The Norns will have objects like teleport machines, submarines with viewing ports, desert islands, bees' nests containing honey, jack-in-the-boxes, rubber balls, and so on at their disposal, and the interest lies not in seeing whether they can merely survive but in seeing how they can develop by learning from visual and tactile stimuli (coming from both found objects and humans playing the game). It will also be interesting to note how groups of Norns can learn to interact with each other, and most important of all, how that interaction alters down generations of Norns.

Not even Millennium knows what is going to happen in any of these respects, so everyone who becomes an early *Creatures* adopter will be engaging in a fascinating experiment in digital genetics. Of course, Millennium might not have got things quite right, so this experiment may prove a huge flop. At least Norns only have a life-span of roughly 40 hours, so it will take much less time for *Creatures* adherents to see the effects of evolution than it does in the natural world. Indeed, one of the most startling aspects of Millennium's *Creatures* is its potential as an experiment in digital social engineering. This is something which Millennium hopes to monitor carefully using the WWW.

To understand what is meant by digital social engineering, imagine the organic analogue: an entire new species, perhaps as the result of a major genetic mutation, springs into existence. How will this new species evolve? How will it cope with differing environmental conditions? How will different races of the species evolve in isolation in different parts of the world? And what will happen when these races cross-breed? The structure of *Creatures*, at least on paper, should enable us to observe these phenomena in the digital world.

Each *Creatures* owner will take delivery of a set of eggs, on disk, which have different genetic characteristics to all other copies of *Creatures* — or so Millennium assures us. Millennium has built into *Creatures* the ability to manipulate your Norn's genomes, so expert *Creatures* users will be able to perform genetic experiments designed to breed a certain type of Norn. Millennium is hoping that, as copies of *Creatures* find their way around the globe, people in different countries will interact with their Norns in different ways, and manipulate their genomes in different ways, thus breeding different races of Norns with different behavioral patterns and social characteristics.

Millennium Interactive's Michael Haywood predicts the company's CyberLife technology will find uses in traffic control systems and more

Norn eggs can be distributed freely. Having bred, say, ten generations of Norns, you could take one of the latest batches of eggs, put it on a disk and hand it to a friend, or post it on the Internet. This raises all sorts of possibilities, which are rather reminiscent of dog-breeding. For example, warrior Norns could be bred, or clown Norns. Even Millennium does not know to what extent this will take place, but let us hope that the basic code it has written is sophisticated enough to enable Norns to develop emphatically through the generations.

Digital life, it seems, has the potential to tell us much about ourselves. How would have ever thought that such a revolutionary social experiment would be sold as a computer game? ng

mated, creating progeny algorithms that attempt to solve the problem, and so on, through multiple generations until a successful algorithm evolves.

Unfortunately, while the term Artificial Life certainly sounds cool, there are some who question the validity of using the term "life" to describe this new science. "Artificial life as a paradigm is being grossly overused," says Scott Collins of Anark, who's *Galapagos* (see page 52) features an Artificial Life construction, Mendel, as the main character. "There is no language for Artificial Life. From a mathematical standpoint there is just no basis for discussion — 'Artificial Life' is just a popular term, and the distinction between real Artificial Life and AI is being blurred right now."

Collins continues, "We actually prefer to discuss this technology in terms of complexity theory. All the things that are being done in 'Artificial Life' can be better described in terms of complexity theory — neural networks, NERMs, genetic algorithms, and genetic programming."

Complexity theory is basically the study of how complex systems change over time, and the underlying reasons that cause that change. Collins presents the analogy, "Imagine you have a big huge plastic sheet and you toss two handfuls of sand onto it. Then you vibrate and wrinkle the sides of plastic, causing the sand to move around in interesting ways. Now imagine you made the plastic invisible — but you can still see the sand move and you see all these weird interactions and dependency. Complexity theory is a means to let you understand the invisible plastic and how and why the plastic brings about changes in the thing you're observing."

In the real world, complexity theory can be used to demonstrate that very simple inputs — a butterfly flapping its wings in Siberia — can have very real, dramatic consequences in totally unforeseen areas — like a hurricane in the Atlantic. (To continue the plastic sheet analogy, pushing the plastic sheet to raise one grain of sand one millimeter may create a depression elsewhere in the sheet that causes a thousand grains of sand to drop a meter — it's similar to the proverbial straw that broke the camel's back). "You can go from as small as you can imagine to as large as you imagine, and you can find no end to the scale of complexity," says Collins. "It points out to

The "Norne" in Millenium's game *Creatures* can't speek, but word balloone show their epproximate (hey, they're Norne) thoughte

you how little we know and how little we can control the world around us. Complexity theory points out how obscenely hard it is to know anything about any system." And yet with a few simple rules, a system that generates an immense amount of realistic-seeming complexity can be generated on a computer as primitive as an Apple II. Collins adds, "I think that complexity theory is the most significant paradigm (mathematical and scientific) that has graced physics, mathematics, and scientific thought since Newton's discoveries. It spells an end to a reductionist view to the world around us."

But how does it relate to games? "You can use complexity theory to create algorithms that exhibit those same adaptive characteristics observed in natural systems — things that exhibit lifelike qualities that are simply not found in rule-based AI systems," Collins explains.

This has two major implications that are likely to bring about a more fundamental change in the way people play — and create — games than any other advance foreseeable in the next decade.

First, expect games that feature Artificial Life creations as the major characters. The first two games to feature Artificial Life in any significant way, Millennium Interactive's *Creatures*, and Anark's *Galapagos*, take this strategy, in which the gameplay revolves largely around interacting with a creature or creatures that act in a life-like manner. Don't confuse this with the toy (but still very enjoyable) life of games like PF Magic's *Dogz* or *Catz*, which use a rule-based, AI method to create a simple simulation of living animals.

Mendel, the star of *Galapagos*, comes with no preset behaviors, and is for all practical purposes, a real, independent organism — not a simulation. Norms, the characters in *Creatures*, have a number of behaviors preprogrammed in but still also exhibit much of the unpredictability and self-organizing behavior of Mendel. However, Collins cautions potential players not to accept the claim of every game that boasts of using Artificial Life at face value. "There are a lot of people who I think will try to pull the wool over people's eyes," he warns, " and pass products off as being this or this, making claims that far exceed their actual characteristics."

Sound intriguing?

Now imagine that not just the opponent AI, but everything in a game is designed with Artificial Life characteristics — the environment, the NPCs in an RPG, the scenery texture maps, the personalities of your computer-controlled companions, the motivations of the drivers of every tank on a battlefield, everything. The possibilities are literally endless.

Complexity theory works on both a macro and micro scale. Imagine the effects of charting the personality of every worker on the line of every factory and every consumer in a business sim. It literally couldn't be done in a million person hours using conventional programming techniques, but with Artificial Life techniques it's possible. Adds Collins, "What complexity theory-based techniques will offer is a scary, almost surreal, amount of unpredictability that will really bring you into these virtual worlds. As bandwidth increases, and as we create more and more immersive graphics, you're going to find yourself in worlds that are amazing mock-ups of worlds you can't imagine now." Artificial Life will lend a type of spice that will make every virtual experience feel like it's real in its own way. It will change the overall quality of games dramatically.

After playing a racing game for a week, a player could have a fundamentally different game than someone else who purchased the same title

Second, by applying the principles of complexity theory to standard AI routines, new routines that tailor the AI to the way the player reacts can be generated "on-the-fly." After playing a racing game for a week, say, a player could have a fundamentally different game than someone else who purchased the same title. It could have evolved into a game in which the strategy of the computer opponents was to ram your car if it got too far behind, while another copy of the game could have opponents whose strategy it was to simply give up and conserve resources for the next race. Yet another copy may simply ensure that the computer car is tuned the same as yours.

As in so many other areas, games are turning out to be one of the first practical applications of Artificial Life. But the technology is not limited to games.

Millenium's Michael Hayward is brim-full of examples: "What Artificial Life will be good at is building a knowledge base with no preconceptions. For example, it could be used in Internet search engines, where it could learn the sort of things you like and go and find them. Or, it could cope with 3D database analysis, in which a company like Visa could use it to monitor buying patterns and look for weird stuff. Likewise, it could be

Essential Reading

For more information on Artificial Life and Complexity Theory, Next Generation recommends perusing the following:

Artificial Life Games Homepage

http://gracco.irmkant.rm.cnr.it/luigi/lupa_algames.html#1

Plenty of links and software, but one caveat — these "games" are largely non-interactive demonstrations of a-life technology. While fascinating, don't get your hopes up if you're looking for an a-life based shooter. Lots of the games come with source code.

Artificial Life Online

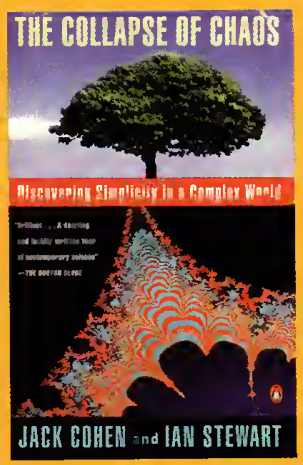
http://alife.santafe.edu/

Sponsored by the MIT Press, this page provides lots of links as well as a great deal of content. As a good starting point for learing more about Artificial Life, this site has information on the basics of the science. Much of the material is highly technical in nature, and not for those who shy away from difficult math and physics concepts.

Marco's Maddening Artificial Life Page

http://www.wi.LeidenUniv.nl/home/mvdweg/alife.html

Lots of links, as well as some good local content, including an excellent MPEG movie, and some very interesting papers characterize this page, which is done with a more light-hearted style than most. A-life has become an intriguing hobby for many in academia.



The Collapse of Chaos: Discovering Simplicity in a Complex World

Jack Cohen & Ian Stewart
Penguin, 1994

Although the book assumes you have zero knowledge of science (and thus is a little patronizing in the early chapters), it presents the concepts of Complexity Theory as well as anything we've seen. The first half of the book focuses on what Science knows about Complexity Theory, the second raises questions about what it doesn't, in a very interesting way.

Artificial Life: A Report from the Frontier Where Computers Meet Biology

Steven Levy
Vintage, 1992

The best popular work on Artificial Life, Steven Levy (author of the must-read Hackers) traces the sometimes controversial history of Artificial Life from Von Neumann to the present. Levy also delves into some of the philosophical issues raised by Artificial Life.

used to make stock market predictions.

"Because it has no preconceptions," Hayward continues, "it won't know anything at the start. But it could monitor the stock market over a period of time and on the basis of that predict future trends. Or it could be used on massive phone networks to predict call surges."

These are all areas in which AI-based neural networks have been used to offer oracular predictions, with mixed success, so it would appear that in the same way, Artificial Life has much proving to do.

Hayward points out that AI-based neural networks have preconceptions. This is because they are linear and rule based — one set of inputs fed into a neural net will always produce the same output. This is emphatically not the case with Artificial Life systems, which have an in-built element of unpredictability, which comes from the genetic engine.

One application of Artificial Life currently under investigation is in systems of traffic lights, where each traffic light on a road could talk to its immediate neighbors, and, with the help of rudimentary, automatically generated traffic flow data, learn how to keep traffic flowing as quickly as possible. Other applications of AL include televisions which learn what sort of programs you like to watch and intelligent microwaves which automatically cook, say, a pizza for the right length of time.

If it all sounds very far-fetched, not unlike the grandiose claims of early AI researchers, it shouldn't. Genetic algorithms have already been used in several real-world applications, and unlike AI expert systems, which require massive capital investment for potentially limited returns, Artificial Life-based systems have the potential to be cheap and easily customizable.

Artificial Life is one of the most exciting new fields of scientific research to come along in years. Whereas most players may have experienced what *Zork* author Dave Lebling termed, "the domestication of AI," when they play games, the imminent arrival of *Galapagos* and *Creatures* should give gamers a chance to interact with unfettered technology that is absolutely on the frontiers of scientific discovery. It's going to be very, very cool. ng

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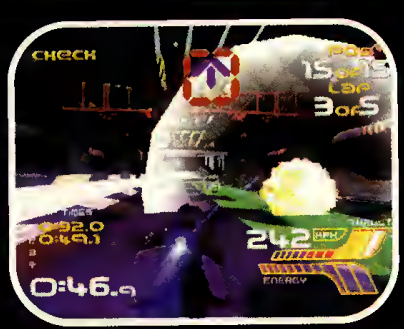

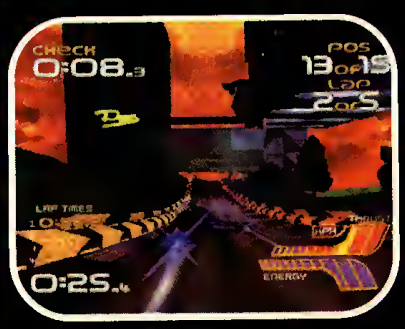

KIDS TO ADULTS
K-A
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PlayStation

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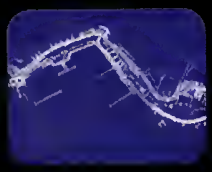

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THE GREAT VIDEOGAME SWINDLE?

Who really invented the videogame? Most people will say Nolan Bushnell with *Pong*. A few may say that Steve Russell's *Computer Space* started it all.

But there's more to this story than meets the eye. Prepare for scandal, intrigue, and wheeling and dealing as Next Generation uncovers the roots of the videogame industry...

Although many gamers will remember Steve Russell's *Space War* as the first computer game, for most people — and for most practical purposes — in the beginning, there was *Pong*.

Certainly, this staggeringly primitive coin-operated arcade game involving two little lines of light gently batting a little square of light across a screen is the accepted starting point for most trawls through the history of the multibillion dollar beast that is today's interactive entertainment industry.

It follows, therefore, that the man widely thought of as the creator of *Pong*, Nolan Bushnell, is hailed as the founding father of videogaming. The product and the man are part of the game market's mythology: the brilliant breakthrough and maverick genius that lit the blue touch paper for the most dramatic cultural and corporate explosions since the birth of rock 'n' roll.

But in reality, *Pong*'s role in the development of the videogame business — while undoubtedly pivotal — may not be as epoch-making as the most accepted accounts suggest. And Bushnell's role in the development of the game is also worthy of close examination. Bushnell openly acknowledges that he was a fan of *Spacewor* and that this was the inspiration for his own work toward the creation of *Pong*. But there is more to this story than a simple technological evolution — in the history of *Pong*, something stinks.

Did Bushnell invent *Pong*, or was it actually created by another one of Atari's employees, while Bushnell wasted time on a more complicated project that would never see the light of day? And then, either way, was *Pong* an Atari creation, or was the idea "borrowed" from Ralph Baer and the ill-fated Magnavox Odyssey? And even if it was, did Baer come up with the game by himself, or did he "borrow" it from Willy Higginbotham, a little-known employee of the U.S. Government's Brookhaven National Laboratory for nuclear research?

Pong's roots can most usefully be traced to the Massachusetts Institute of Technology at the dawn of the 1960s. The Institute was home to the Tech Model Railroad Club, a high-minded group of students that some would call esoteric and others would call nerds.

Fascinated by technology, they were intrigued by the hulking giants that were

the leading-edge computers of their day, the biggest and best filling entire rooms, running either punch cards or paper tape as software.

In the summer of 1961, Digital Equipment donated its latest computer to MIT, the PDP-1 (Programmed Data Processor-1). Compared to its predecessors, the PDP-1 was of comparatively modest bulk — about the size of a large automobile. It sold for a paltry $120,000, and rather than displaying its information on printed paper, the TX-O came complete with what was then called a computer readout terminal (a monitor, in modern parlance). The TMRC adopted it immediately as its own.

In those days, when computers were as rare as nuclear reactors, hackers wrote programs for the good of the computer-loving community. PDP-1 programs were stored on ticker tapes in a drawer near the computer, where anyone could try them out or even revise them. Creating a new program was considered an impressive hack. So was making a good revision.

Steve Russell, one of the Model Railroaders, decided to make the ultimate hack, an interactive game based on the sci-fi he loved. Initially his progress was slow, frustrating fellow club members who were intrigued by the project and anxious to see some results.

In the end, Alan Kotok, a more senior member of the TMRC, had to push Russell into finishing his work. When Russell confided to Kotok that he needed a sine-cosine routine to get started, Kotok went directly to Digital Equipment to get it.

"Eventually Allen Kotok, came in and said, **'All right, here are the sine-cosine routines, now what's your excuse?' He'd gotten it out of the users library.**

And I had run out of excuses so I sat down and wrote the program to do two space ships on the CRT and allow you to control it from the switches. This is 1961 was the prototype and the finished version was '62."

STEVE RUSSELL

It took Russell nearly six months and 200 man-hours to complete the first version of the game, a simple duel between rocket ships. Using toggle switches built into the PDP-1, players controlled the speed and direction of both ships and fired torpedoes at each other. Russell called his game *Spacewar*.

"It was always a two-person game, there **wasn't enough computing power available to do a decent opponent. I was the first person not to make money on a two-person computer game.**

The rockets were rather crude cartoons. But one of them was curvy like a Buck Rogers 1930's space ship. And the other one was very straight and long and thin like a Redstone rocket. And they were commonly called the Needle and the Wedge.

Except for the pacing, Spacewar was essentially like the game Asteroids. The space ship controls were four switches, four buttons for rotate counterclockwise, rotate clockwise, fire your rocket which gave you thrust, and fire your torpedoes. The basic version used switches on the console, and your elbows got very tired."

STEVE RUSSELL

In typical hacker fashion, TMRC members revised *Spacewar*. Some of these additions improved the game so much, they became integral elements. By the time

Spacewar was finished, Russell's simple game had an accurate map of the stars in the background and a sun with an accurate gravitational field in the foreground.

"I started out with a little prototype **that just flew the space ships around. Pete Sampson added a program called *Expensive Planetarium* which displayed stars as a background. Dan Edwards did some very clever stuff to get enough time so that we could compute the influence of gravity on the space ships. The final version of that was completed in the spring of 1962."**

STEVE RUSSELL

Battles took place around Edward's sun. Players could hook into its gravitational field to swing around and catch opponents. Hovering too close or flying into the sun meant death. Another hacker added a hyperspace button. When trapped by an opponent, players could hit the button and disappear. The risk was that you never knew where your rocket would reappear. You could reappear safely across the screen, or might appear too close to the sun to save your rocket.

Along with creating the first computer game, the members of the TMRC invented another first in electronic entertainment. Tired of having sore elbows, Alan Kotok and Bob Sanders scrounged parts from the Tech Model Railroad Club and assembled remote controllers that could be wired into the computer. These remotes were easier to use than the PDP-1's native controls, they had dedicated switches for every Spacewar function, including hyperspace buttons. This was the forerunner to the joystick.

Despite enjoying acclaim from his peers — and *Spacewar* being a fixture on just about every computer in every university by the mid-'60s — Russell never made a penny from his game. There were no such things as home computers, and the technology was too expensive to adapt for use in arcades.

He should, however, be rightly recognized as the creator of the world's first computer game. Russell made no attempt to copyright his work or try to collect royalties from it. He was a hacker, and he'd created his game to show that it could be done. He also sowed the seeds of everything that is to come...

But what of the first videogame (a dedicated game-playing computer that plugs into a TV)? In trying to trace any kind of technological "family tree," it's very difficult to come up with firm conclusions. There are two main problems: First, there are times when one technological leap inspires another, and there are also times when independent development of similar technologies occurs simultaneously, in genuine isolation of each other (and the only real way to tell the difference between the two is to trust the word of the parties involved). Two, when something is gradually evolving over time, at what point does it actually become something "new"? How does an outside observer jump in and pinpoint the moment when the crucial evolutionary step was made? It's not an exact science and is invariably open to subjective interpretation.

The case of Willy Higinbotham and his "tennis game" is an example of the second problem. The case of Ralph Baer, the Magnavox Odyssey, and whether or not Nolan Bushnell saw this game four months before the "invention" of *Pong* is an example of the first.

In 1958, according to Leonard Herman's book *Phoenix*, Willy Higinbotham was working at the Brookhaven National Laboratory, which was funded by the U.S. Government's nuclear research program. The facility often hosted touring parties of officials and guests, and Higinbotham thought it would be fun to come up with something more interesting than the flashing lights and graphs with which such visitors were normally "entertained." Working with one of the laboratory's osciloscopes and having read the device's instruction manual, Higinbotham worked on a simple program that enabled two people to play "tennis." A horizontal line on the bottom of the screen represented the ground, and a small vertical line represented the net. Two players could then "bat" the ball between each other, at various trajectories.

In many ways, it wasn't a game. There was no score, the interaction was limited to defining the trajectory of the ball, and players simply continued until the machine was switched off. But in many ways, Higinbotham's creation can be seen as the beginnings of the idea that would eventually become *Pong*.

Higinbotham never had any commercial plans for his "game," and it is widely believed that it never actually got any further than the Brookhaven labs. Had Higinbotham considered marketing the game and applied for a patent, the rights would belong to the U.S. Government (it was developed on government equipment in government time by a government employee) which would make the videogaming world of 1996 a very different place. But it was never positioned as a way to make money — or indeed as a serious recreational device — yet whether by

coincidence or not, a very similar game would be developed in the years to come that would spawn a multibillion dollar industry.

"August 1966. I'm sitting around in New York **on a business trip at the East Side Bus Terminal, thinking about what to do with a TV set other than tuning in channels you don't want. And I came up with the concept of doing games,** building something for $19.95.

Now you got to remember, I'm a division manager. I run 200 people. I have a seven or eight million direct labor payroll. I can put a couple of guys on the bench who can work on something. Nobody needs to know. Doesn't even ripple my overhead. And that's how I started."

RALPH BAER

And so another branch of this evolutionary tree begins at Sanders Associates, a New Hampshire-based defense contractor in the late 1960s. Like many large contractors, Sanders had its share of sensitive and top secret activities; but in 1967, no one would have guessed what was going on in one of the labs.

Sanders Equipment Design Division was led by a stern and meticulous engineer named Ralph Baer, a man with a background in radio and television design who had been with the company for more than 10 years. Among Baer's best attributes as an engineer was his methodical recording of every step of the inventing process. From the moment he began fleshing out new designs, Baer would record the entire process, date it , and file it away. For that reason, he can tell you the exact date and location where he first got the idea to make television games.

Baer and his team created prototype videogames using a crude mechanism for transferring material to the television screen. The one thing they all lacked was a sense of fun (they made toys like a lever which players pumped furiously to change the color of a box on a television screen). Though Baer would later prove to be an excellent electronic toy and game designer, in the beginning he thought too much like an uptight engineer.

When he first presented an early light gun invention to the executive board, including the company founder, Royden Sanders, most of the executives felt that Baer was wasting the company's time. Some suggested Baer abandon the project, others simply wanted to pull the plug.

"The IR & D director came up and played **with our rifle — we had a plastic rifle by then. And he used to shoot at the target spot [on a television screen] from the hip. He was pretty good at it, and that kind of got his attention. We got more friendly. And it kept the project alive."**

RALPH BAER

Not only did it keep the project alive, but it also enabled Baer to allocate some extra resources to his "toys."

"Bill Rusch was **an engineer who worked for Herb Campman, the corporate IR&D director. I needed an engineer, and Rusch came mostly because his boss decided he didn't want him.**

My biggest problem that summer was motivating Rusch. He'd come in at 10:00 or 11:00 am and spend an hour talking, 'cause he was lazy and frustrating as hell. Rusch was an extremely creative and extremely lazy, hard to motivate guy. Brilliant. Also, he played really hip guitar.

But it's a good thing we had him because he helped put us on the map."

RALPH BAER

ng special

And so, in 1967, Baer added another member to the team, a man named Bill Rusch who brought some needed understanding of fun and games. With Rusch on board, the games began to take shape. He made a game where one player chases another player through a maze.

The first games were all two-player games in which players controlled every object on the screen. In September 1967, Rusch suggested a new game in which a hardwired logic circuit projected a spot flying across the screen. Originally, the object of the game was for players to catch the spot with manually controlled dots. Over time, the players' dots evolved into paddles and the game became Ping-Pong.

"So here we had a respectable Ping-Pong game going, and it wasn't long before we called it a hockey game. Remove the center bar, which we put up there to emulate the net, and now it's a hockey game. So we put a blue overlay for blue ice on top of the screen so it looked more like hockey. We later added a chrome signal to generate the blue background electronically.

We always had 3 controls. A vertical control for moving the paddles up and down, a horizontal control for moving them from left to right, so you could move close to the net if you wanted to, and what we called an "English control" which allowed us to put English on the ball while it's in flight."

RALPH BAER

As a military contractor, Sanders couldn't suddenly go into the toy business, so Baer had to try and find a customer for his game machine. He urged his bosses to notify television manufacturers about the project.

He'd come up with the right audience. General Electric, the first TV manufacturer to evaluate Baer's toy, showed some interest. Next came Zenith, then Sylvania. Both GE and Sylvania returned for second evaluations. RCA almost bought into the project and contract papers were written but never signed.

In 1971, Magnavox hired a member of the RCA team that nearly purchased the project. He told other Magnavox executives about the television game he'd seen at Sanders. Magnavox arranged for a demonstration of the television game and immediately saw merit in the idea. A contract was signed in 1971, production started in the Fall, and early units were shown at Magnavox dealerships in May 1972. It was called the Odyssey 100.

"Magnavox did a really lousy engineering job. They over-engineered the machine and upped the price phenomenally. So the damn thing sold for $100. Here's this thing I wanted to sell for $19.95 coming out at $100. Then they began their advertising towards Christmas in the fall of '72, and they showed it hooked up to Magnavox TV sets and gave everyone the impression that this thing works in the Magnavox TV set only."

RALPH BAER

Ralph Baer and Steve Russell never met socially. They would, however, meet on opposite sides of some very important litigation. (continued on page 211)

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BY CRASH BANDICOOT™

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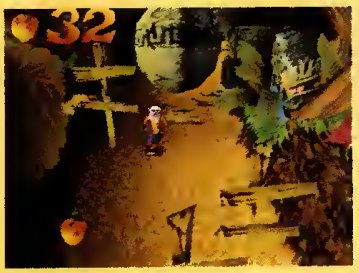
KIDS TO ADULTS K-A CONTENT RATED BY ESRB

2. HERE'S ME AT THE SPACE NEEDLE.

3. HERE'S ME WITH SOME OF THE GALS AT SEATTLE SLIM'S.

MY GAME →

CRASH BANDICOOT



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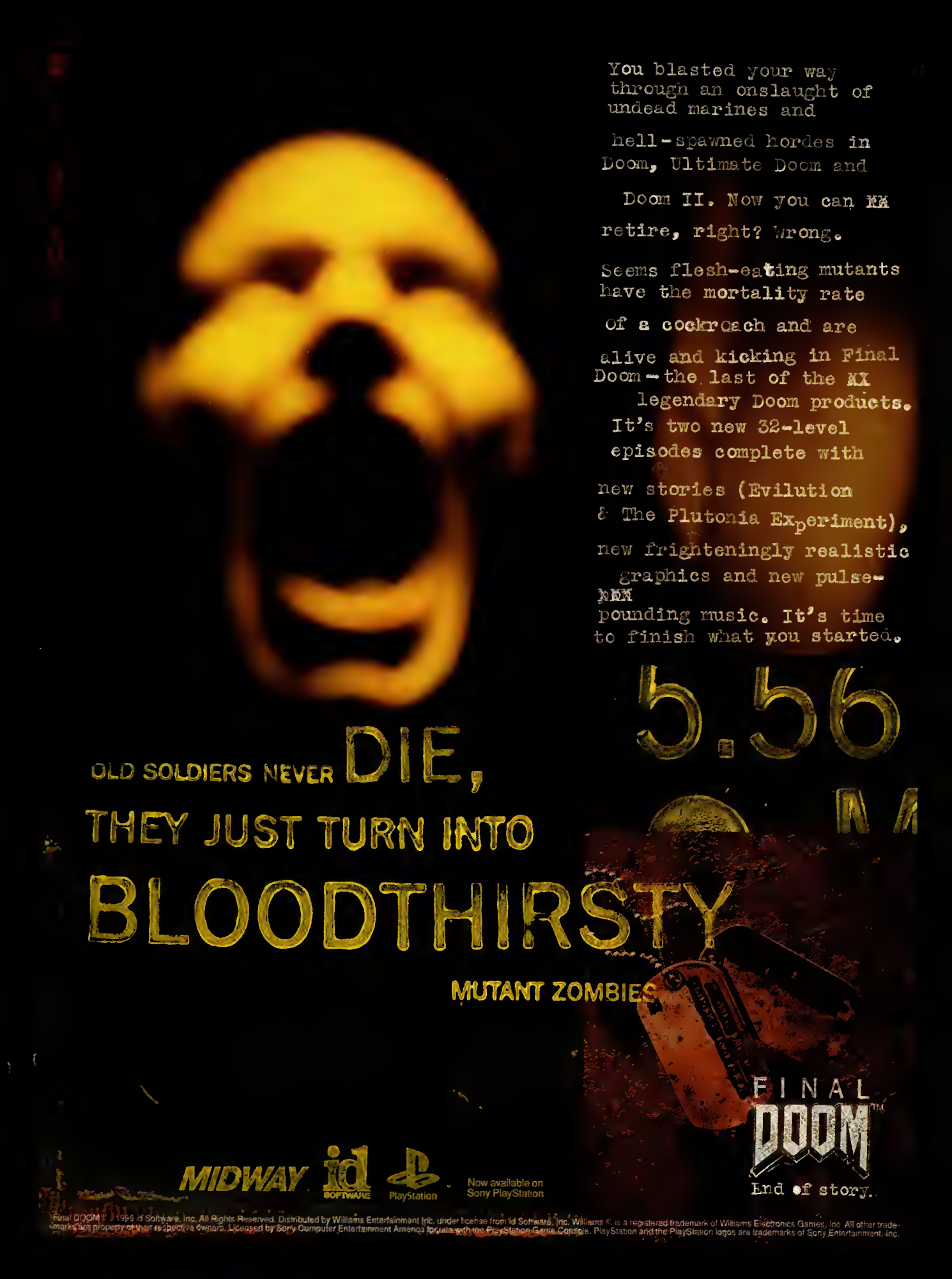
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31 new games previewed — it's a monster

Don't expect any sort of coherent theme this month — just the heart and soul of the largest issue **Next Generation** has ever put together. On the following pages you'll find some of the best games the world's software publishers have planned for you this Christmas and beyond.

Next Generation OnLine, http://www.next-generation.com/

Sega AM Annex

There's a new AM division at Sega HQ. Now, the team responsible for *Sega Rally* is heading back out onto the highway...

These eerly visuels from *Sega Touring Cer Championship* give en indication of the quelity of grephics that AM Annex is striving for. Sega's Model 2b boerd delivers the visuels elthough the teem ere enxious to get to grips with its formideble big brother, Model 3. *Sege Relly 2*, perheps?

Format: **arcade**
Publisher: **Sega**
Developer: **Sega AM Annex**
Release Date: **TBA**
Origin: **Japan**

Primarily we want to produce very powerful games, using strong colors and graphics that are very realistic. Also, it's very important that we work on games that we really want to do — we don't want to only make competitive games, we want to make captivating games based on new concepts, games that are really challenging for the player."

These are the words of Tetsuya Mizuguchi, the Sega producer who's broken away from the strict confines of the company's AM divisions and hand-picked a team that he hopes will be able to replicate the success of *Sega Rally*, the smash hit whose development he oversaw while working as a producer within AM3.

"We wanted good working conditions, and our new department is small," he explains. "From a creativity point of view, big teams have

"Most of all, we are really impatient to start working with the Model 3 hardware"

Tetsuya Mizuguch **Sega AM Annex**

Tetsuye Mizuguchi's embition is to produce games with unrivelled reelism for both coin-op end console merkets

***Saga Touring Car Championship* offars a choica of cars (top right). Director Kanji Sasaki and his team (right)**

The atmosphare within Saga's annaxed coin-op dasign department is vary ralaxed, with tha amphasis on creativity and innovation. First project, *Sega Touring Car Championship* (abova left)

Sega AM3

For the longest time, it was Sega's other coin-op division — AM2 — that received nearly all the press and public attention. Headed up by Yu Suzuki, and responsible for such hits as *Out Run*, *Virtua Racing*, the *Virtua Fighter* series, *Daytona USA*, and *Virtua Cop*, it was only with the arrival of AM3's *Sega Rally* that it became apparent to many outsiders that AM2 weren't the only guys pushing the envelope

With games like *Last Bronx*, *Manx TT*, and *Virtual On* following in *Rally*'s successful footsteps, AM3 soon found itself with its own entourage of press and dedicated gamers.

Will AM Annex manage to reach the same heights of critical praise and commercial success? Only time will tell. But the dedication of Tetsuya Mizuguch and his team to making it happen is without question.

advantages and disadvantages. We certainly don't believe that it's bad to be separated from AM3. Before creating the department, I explained the concept to AM3's manager and then to Higashi Suzuki, the head of amusement machine development at Sega. Together we all agreed that creating a new department, separate from AM3, would be a good thing.

"Initially, we started with only six or seven people — *Sega Rally*'s programmer and some designers. Then we took on board more staff. We're currently only working on *Sega Touring Car Championship*, but we're aiming at making about two-and-a-half games a year. This year we might even begin work on *Sega Rally 2*, but the game is only running in our heads at the moment! Most of all, we are really impatient to start working with the Model 3 hardware."

Sega Touring Car Championship is the logical progression from *Rally*. Presently only 60% complete, the finished game will simulate the touring car racing scene that's enjoyed a surge in popularity in Europe in recent years.

"It's essentially a competition game playable with linked cabinets," explains Kenji Sasaki, the director of the project. "Beginners will be able to play it and take advantage of the gradually increasing difficulty level. As in *Out Run* you'll have to reach a goal in order to get to the next level. But advanced players will also be able to enjoy its time-attack mode."

The team behind the game has pedigree, though not all of the Annex group has worked on racing titles before.

"Only a few of the staff that worked on *Sega Rally* are working within what's now known as AM Annex" says Mizuguchi. "We brought in some members from outside, and some have been transferred from other departments within Sega. We've got about 15 people in Sega Annex. As I said, we didn't want a big team. Our goal is to get respected creators working together."

Sega Touring Car Championship's

With *STCC*, AM Annax and Tetsuya Mizuguchi's ambition is to incraase the feel of "weight" to the gama's handling

ng alphas

programmers are striving to make it an even more exciting experience than its previous racing efforts.

"In *Sega Rally* the player was principally driving alone — it was kind of like the player performing in a competition against himself," points out Mizuguchi. "This time there'll be many cars appearing during a race, cars will bump into each other and generally get in each others' way. The competitive aspect will be really improved," he promises.

The rough-and-tumble angle is one that graphic designer Kumiko Shioji is especially keen to bring to the fore. "We want the player to be impressed by the game from the first moment they look at it. When cars bump into each other we're aiming to get very impressive effects. We really want to avoid having cheap-looking graphics."

Sega is respected for researching its driving games meticulously, and this attention to detail is in no small part responsible for the success of games such as *Daytona USA* and, more recently, *Manx TT*, whose development saw its designers visiting the Isle of Man in the U.K. to get firsthand experience of the sport. AM Annex has approached the *Touring Car* project with a similar devotion to detail.

"We thought that a competition covering cars from all over the world would be interesting," says Mizuguchi. "We had the opportunity to see touring cars running up close, some of us had the chance to drive real racing cars, and we also met some pro drivers. After this, everyone here was excited by the prospect of making a game based around touring cars."

With its now customary 60fps update and hi-res display, *Sega Touring Car Championship* looks destined to become another racing classic for Tetsuya Mizuguchi's in e st'le that includes *Sega Rally Championship*, and more recently, the excellent motorbike racer *Manx TT*

Kumiko Shioji has designed the game's cars and backgrounds, having visited numerous locations around the world to acquire the flavor of real tournaments. "I went to Finland, and I took some photographs in order to recreate backgrounds in the game. I look at real life backgrounds with my own eyes and try to recreate the same atmosphere on the computer screen. As you'd expect, the main problem I have is trying to keep everything close to reality."

Competition for places on eny of the AM teems is fierce. Game designers end progremmers from ell over the world espire to join coin-op's elite

The team has only been working on the game since April but planned to have a playable demo finished by September in time for the JAMMA show. The eventual goal is to provide four cars to choose from — an AMG Mercedes, an Opel Calibra V6, an Alfa Romeo 155 V6 TI, and a Toyota Supra GT, all of which have been designed with cooperation from their manufacturers and thrown around on screen using Sega's well-established Model 2b technology.

Miziguchi's *Rally* was lauded not only for its visuals but also its feel, a factor that made it the coin-op with the closest-to-reality feel ever seen in the arcade. Naturally, Mizuguchi is aiming for similarly impressive results in *Touring Car*. "We wanted to make a game with lots of 'gravity.' The weight of graphics could be the keyword in describing the game — we've been saying that a lot recently. We wanted to make a game graphically very 'heavy.' Sound-wise we're aiming for really impressive effects and music. We've sampled the engines of real cars, and we'll be putting speakers in the seat to give a realistic feel. We've also included techno music."

Mizuguchi's fondness of the dance music scene is manifesting in a way that mirrors what has been happening in the Western videogames industry, which has seen collaborations between the likes of Psygnosis and techno bands such as Orbital and Leftfield.

"In *Sega Rally* the player was principally driving alone. But this time there'll be many cars appearing during a race. So the competitive aspect will be improved"

Tetsuya Mizuguch **Sega AM Annex**

Although *STCC* seems dastined to be a a graat gama, it must ba ragardad as somawhat of a warm up lep for AM Annex, prior to gatting to work with the Model 3 hardware

Will tha competitiva rivalry between Saga's AM2 (*Daytona USA*, *Virtua Fighter*) and AM3 (*Saga Rally*) divisions spill ovar to AM Annax? Gamars can be forgiven for hoping that it will

"Some of the music has been done by dance artists, and we've also got some work from AVEX-TRAX [a leading Japanese record label specializing in techno]," confirms Mizuguchi. "The concept was to make BGM [background music] which fits with the acceleration you feel in the game, so we decided to use techno music. We've used musicians from Japan, of course, but we're also using an artist from Belgium and one from Italy. We're writing a specific theme song for the game and, as we did for *Sega Rally Championship*, we're going to be putting out a race remix CD."

Sega Touring

Car Championship is likely to mark Sega Annex's first and last dalliance with Model 2 hardware. The team plans next to work with its esteemed Model 3 board, and whenever it's name is mentioned, Mizuguchi's eyes sparkle and a broad grin extends across his face with anticipation. Sasaki-san is equally optimistic about the possibilities afforded by Sega's newest technology. "Until now we haven't been able to make stages using rain or snow. Also we couldn't really do night stages — I don't mean completely dark stages, but stages with medium lighting and nice lighting effects. With a Model 3 board we'd be able to do these sorts of things.

"We've tried to make snow stages with Model 2 but we gave up because the general look was too crude. We'd be able to express ourselves more efficiently with Model 3."

"When a designer is working within the confines of Model 2, the work is very difficult," claims Mizuguchi. "Because the texturing is monochrome, designers have to gather different colors on polygons to get a good effect. This work is very fastidious and time consuming — with Model 3, and in the future, Model 4, the designer will be free to concentrate on other work."

Despite his track

record, Mizuguchi isn't in love with the idea of producing more racing games for the sake of it. "My prime concern is making games that are lively. I want to work on at least one per year and gradually improve their quality," he says. "But I also want to explore new concepts. Personally, I want to make new games that are based on dreams. I'm not saying rally games aren't my dreams, I simply would like to make games related to fantasy."

He concludes: "I want to create new worlds. I would also like to try, at least once, developing a dedicated console game."

Now *that* should be something to look forward to. ng

Graphic artist Kumiko Shioji visited Finland to rasearch data for *STCC*

An interview with Tetsuya Mizuguchi

"Unlike the arts, where it is often a matter of taste whether something is good or not, creating good interactive entertainment is more easily definable"

Tetsuya Mizuguchi has big plans for videogames. A former producer within Sega's Amusement Machine R&D Department 3 (AM3) and responsible for hugely successful coin-ops, *Sega Rally Championship* and *Manx TT*, he is now in a privileged position having formed a new AM department, provisionally titled "AM Annex." In his late twenties and currently enjoying a certain amount of autonomy within this new division, Mizuguchi-san's offices occupy the fourth floor of a small building a stone's throw from Sega's headquarters. And somewhat ironically, considering its racing game heritage, it sits above a car showroom.

Drawing on the talents of a small team of developers previously working within AM3 and AM2, Mizuguchi's first project is *Sega Touring Car Championship* (see proceeding pages). He recently invited **Next Generation** to look at a 50% complete version of the game, and to question him about the new department.

NG: What made you want to break from AM3 and set up a new AM department?

Mr. Mizuguchi: Our new department is a small one but that's not necessarily a bad thing for a working environment — big departments have their disadvantages. Before creating the new division I explained my concept to the head of AM3 and then to Yu Suzuki, and we all agreed that creating a new department would be a good thing.

NG: Will you continue making race games?

Mr. Mizuguchi: I hope to make one per year but while I'm still keen to make racing games I want to pursue some new directions. Personally, I want to make some new games based on dreams — not that *Sega Rally* wasn't a dream of mine! — or related to fantasy. I want to create new worlds and keep things very high-end, using nice colors and very realistic effects.

NG: How long have you been with Sega?

Mr. Mizuguchi: If my memory serves me well, after graduating from university I entered Sega back in 1990 — so about six years. I graduated from Nihon University of Art, a famous Japanese art college, where I majored in literature.

NG: And this led to a career in videogames?

Mr. Mizuguchi: When I was at university I studied different topics like physical senses, media, and so on. I was also interested in marketing... but there are no physical production tasks in marketing so I thought it would be boring. I preferred doing something in relation to human senses or entertainment — something more in relation with human nature, a field where I could do some research. I discovered that the entertainment world would be suitable.

Unlike the arts, where it is often a matter of taste whether something is good or not, creating good interactive entertainment is more easily definable. I chose Sega because it was using new technology and I was able to study things like human movements.

NG: What was your first project?

Mr. Mizuguchi: When I entered the company I joined a department which was doing some arcade cabinet design. During the first year I got involved in many different projects, but because I was interested in computer graphics, I joined a CG department that was designing *Megalopolis* [a prerendered shoot 'em up developed for the Sega AS-1 simulator].

NG: Describe working at Sega.

Mr. Mizuguchi: Sega is overflowing with creative-minded people. It is a very good place for creativity. In our new department, however, we don't feel like we're part of Sega's AM departments. If anything, we feel as if we're an external team. It doesn't mean we are completely free but it enables us to see what is happening beyond Sega's AM departments.

NG: What relations does AM Annex have with AM2 and AM3 ?

Mr. Mizuguchi: We all belong to Sega, so there are some frequent exchanges of staff between departments. Everybody respects the work of others and when a particular division is doing something exceptional, other departments do not hesitate to say so.

NG: Is Sega a typical Japanese company in the way employees are treated?

Mr. Mizuguchi: No, not really. I believe Sega gives its employees lots of freedom. I think it is possible to compare the atmosphere within Sega to the old Hollywood atmosphere. I believe it will be very good for the worldwide leisure entertainment industry to have, at its core, key people who have already had ten or 15 years of work experience within Sega.

NG: How many hours do you work a week?

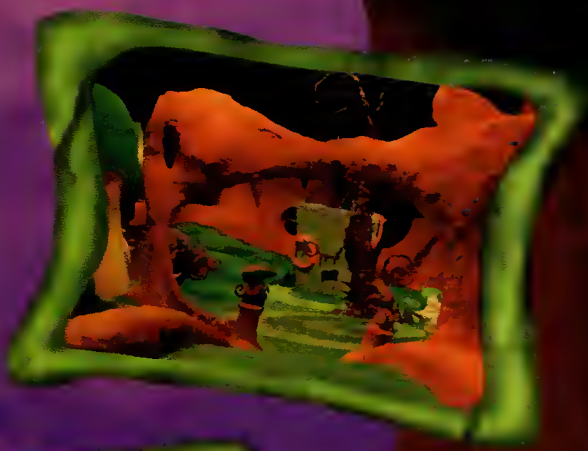
Mr. Mizuguchi: I really don't know. Normally, I begin around ten o'clock but it really depends on the day. We sometimes spend nights in the office.

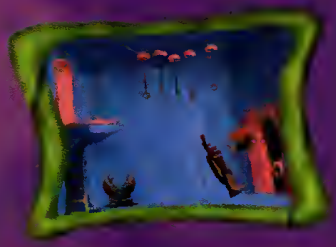
NG: What interests or hobbies do you have?

Mr. Mizuguchi: I like travelling and I'm fortunate to be able to travel a lot with my job. I also go clubbing a lot and I really love techno music, so I often go out in different techno clubs in Tokyo. Needless to say, the music we will put in *Sega Touring Car Championship* will be techno!

In Japan, many young people are making this kind of music, or are playing it as DJs. I enjoy going to techno parties and in this kind of place there is lots of energy and creativity. Sometimes, people will approach me if they know I work for Sega and make me listen to the tapes they've created!

***Sega Touring Car Racing* is the first project to come from Tetsuya Mizuguchi's "AM Annex" division. Real cars such as Mercedes (above) and Opel will feature in the game**



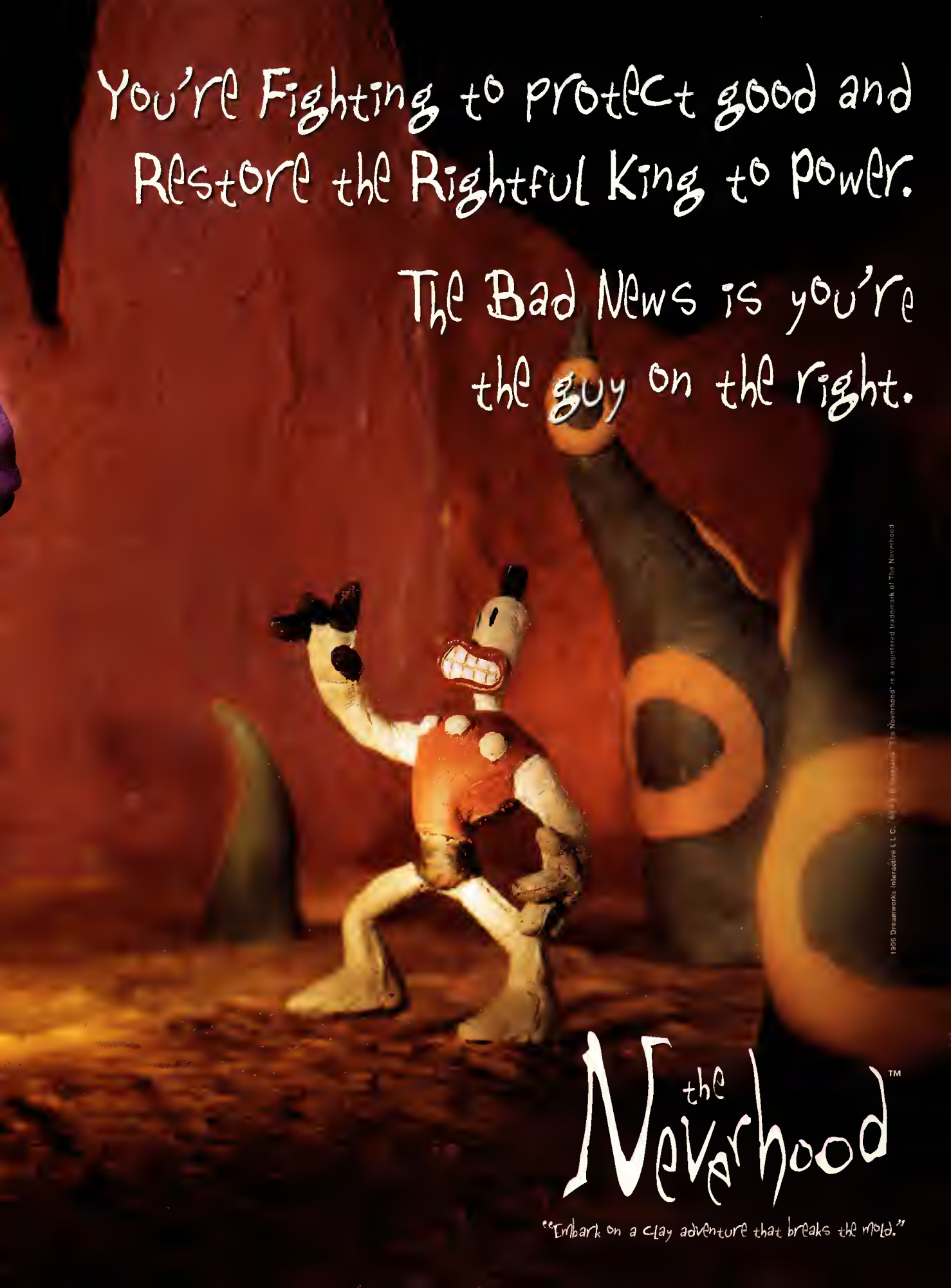


"A winner..."
—LA TIMES

"Clever, an utterly different vision and experience from all the lookalike games..."
—NEWSDAY

The good news is you're a lot smarter than the guy on the left. Good thing, considering you'll have to solve more than 60 puzzles in order to succeed in the twisted, clay-animated world of Neverhood. You'll help Klaymen avoid pitfalls, collect clues, and kick a little clay butt. All to defeat the evil Klogg and bring the Neverhood back to normal. At least, as normal as it ever gets.

DREAMWORKS INTERACTIVE™ [www.DreamWorksGames.com]


You're Fighting to protect good and
Restore the Rightful King to power.
The Bad News is you're
the guy on the right.
the Neverhood™
"Embark on a clay adventure that breaks the mold."
1996 DreamWorks Interactive L.L.C. "The Neverhood" is a registered trademark of The Neverhood

Gundam Gaiden

The mother of all mechwarriors is finally getting the kind of treatment it deserves

Format:	**Saturn**
Publisher:	**Bandai**
Developer:	**Bandai**
Release Date:	**November (Japan)**
Origin:	**Japan**

Look familiar? 'Mech combat has becoma a stapla of video and computer gaming, but tha inspiration for tham all was tha *Gundam* saga — it may hava been dona bafora, but at least *Gundam Gaidan* comas by it honastly

Missions ara fought ovar a wida variaty of tarrain and conditions

The *Mobile Suit Gundam* saga, a long-running series of Japanese manga and anime based around soldiers outfitted with giant, walking battle robots, were the direct inspiration for such U.S. gaming mainstays as FASA's *Battletech*. Predictably, *Gundam* also spawned games for SNES and Genesis, all of which were either side-scrolling action or strategy titles. Meanwhile, in the 32-bit age, titles like *Krazy Ivan* and *Gun Griffon* were showcasing 'mechs the way everyone imagines them: from inside the cockpit.

Finally, it seems that someone at Bandai has woken up to the possibilities. *Gundam Gaiden* is a first-person, in the cockpit game using polygon-modeled 'mechs.

Based loosely on the first three *Gundam* films, *Gaiden* very consciously uses some of the most popular mobile suits in the series. The animation is being handled by the same team who worked on the latest *Gundam* OVAs (Original Video Animation, an animated work released directly to home video), resulting in smooth motion that matches the films exactly. Missions take place in the forest, desert, and at night, and effective use of terrain is a major strategic element. *Gundam* has had a long run, and this latest entry may very well take the series to a new level. ng

PLAYSTATION

KING'S FIELD II™

The King Is Back, But His Field Has Changed!

No more Mr. Nice King! He's working for the dark side now! King Alfred, the Holy King of Verdite has fallen victim to the minions of evil as ASCII Entertainment brings in another installment of last winter's hit PlayStation title *King's Field*!

In King's Field II, you will find the same gripping elements you found in the first King's Field, only with even **MORE** of the fantastic elements that addicted you to the original.

An awesome new world lies before you as you embark on your new quest. ASCII obviously put in an incredible amount of work to make this new quest in the kingdom of Verdite as lavish and realistic as possible. This realism stems from the same technology that was used in King's Field I, but this time, you have the entirety of the kingdom to explore!

Outdoors, inside castles, villages, underground passages and dungeons — all combine to make an immense world that will have you immersed within moments.

Make no mistake, this is no ordinary sequel. Numerous upgrades and captivating elements mix with the most addictive points of the original top-selling adventure to bring you the hottest new title to hit the PlayStation this year.

As you may recall from the first King's Field, a 3D texture-mapped, 360° world of larger-than-life enemies lay before you on the monster infested island of Melanat.

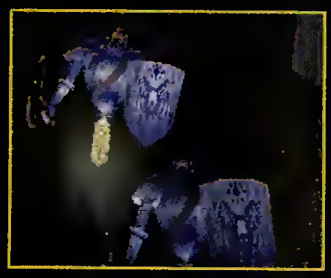
Shipwrecked on this island, you were to battle your way through levels upon levels of dungeons and monsters in search of the Moonlight Sword which was stolen from the King's Throne in Verdite (the kingdom on the mainland).

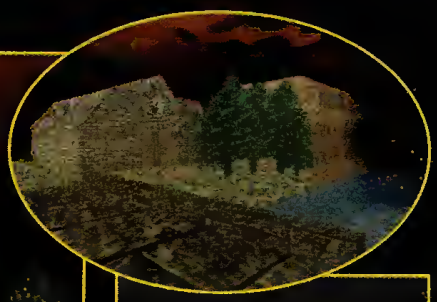
Your character, Alexander, learned magic spells, grew more skilled with his sword, and was able to pick up and equip any weapons, armor, or items found on the island. All of the elements of a winning RPG were packed into a first-person, Action/Adventure outer shell — bringing a very unique game to the genre which held the attention of most everyone. With vast improvements over the first, King's Field II is bound to share the same success story!

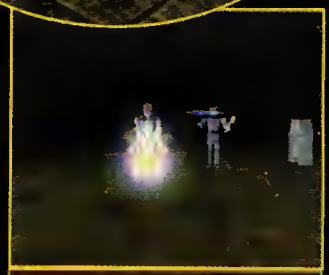
One of the most riveting elements of the new quest is that the storyline has been greatly improved upon! I know that a lot of us thought that the first King's Field was plenty deep, but ASCII has gone above and beyond to make this sequel an experience that will draw you deep into the involved plot — disabling you from putting down your controller until every last *Red Eye*, *DragoNewt*, and *Stool* are driven from the kingdom!

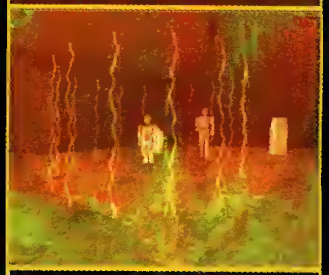
You start out the game with an introduction which allows you the chance to find out what has been happening since *Alexander* brought back the Moonlight Sword to the kingdom of Verdite five years ago. A cool intro sequence complete with voice over and full-motion cinematics bring you into the world as the King's son, *Prince Austin Lyle Forester*, a title that should have everyone in the kingdom bowing to kiss your feet. Unfortunately, your father — *King John Alfred Forester I* — has fallen to the will of the evil forces which are attacking your kingdom.

PUBLISHED BY	RELEASE DATE
ASCII Entertainment	Halloween '96
SYSTEM	**THEME**
PlayStation	Action/Adventure RPG
# OF PLAYERS	**SIZE**	**% COMPLETE**
1	CD-ROM	95%









As you progress through the game to go out and save the world, you will have to talk to all walks of life in the kingdom. Eccentric Monks, irate mothers, indifferent soldiers, even an occasional enraged monster will have a few words for you. Your challenge, of course, is to win the favor of the people so that they will give you the help you need as you try to learn new spells of magic, pass over rivers of lava, and collect threads of power that can sew your kingdom back together.

"It's so addictive, they'll have to cut the power to my house to get me to stop playing!"

— Game Tester

Don't get me wrong, this is no "rocking at home with your crochet needles" game we're talking about! You'll come up against some of the most frightening and powerful enemies since Clash of the Titans!

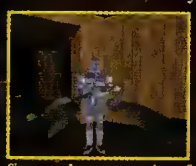
In addition to the game's storyline, ASCII has also put forth a valiant effort to come up with humorous and stimulating dialog and characters to bring your quest to life. Such characters as *Jack*, a 100+ year old resident of Verdite with a more than stereotypical attitude and a funny senility about him, will bring sparks of humor that you'll enjoy throughout the game! Even a bit of romance enters the quest as the scantily clad elf merchant, *Lyn* — who has held a flame for the prince since childhood — drops hints about her feelings that even a *Golem* could comprehend.

Not to forget about the CD quality sound, of course! King's Field II has a wide selection of accompanying music to entreat your ears as you progress along your journey. Original scores are long enough to not sound repetitive and yet are not so intruding as to distract from the ambiance which they so artfully bring to the game. Other sound effects include terrifying wails, screams, and roars from the afflicted and from the enemy; thunderous explosions, the glorious sound of steel on steel during sword fights; and, of course, the exceptional Stereo effects that were such a notable achievement in the first King's Field! You can actually tell how close you are to a monster by how loud the eerie screeches and roars are — with some practice, you can even distinguish what you're going to come up against around the next bend!

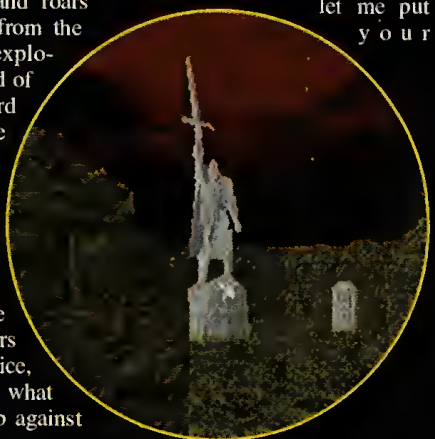
Swordplay...

The fighting technique in King's Field II is slightly different from the original. The enemies have been enhanced to recognize your pattern of attack so that they can turn, block, even parry and thrust to put you quickly into the realm of the dead! What you will have to learn is to circle and then double back while the enemy is distracted. In this way, you will reduce your hits and live longer. As in the first quest, you can always go in for a quick hit, but in King's Field II, you will be less likely to achieve success — the Skeletons, for example, now have the ability to block with a shield, duck under a slash, and stab you while you try to retreat!

In addition, use your magic as a distraction while you go in for a hit. Once you learn some spells, stun the enemy first, then go in for the kill! Enemies can use the same tactics though, so be careful. They also attack in groups, so make sure that you don't get surrounded! Good luck!



With all of the improvements over the original King's Field, you may be worried that ASCII made changes in the intuitive control & easy-to-use pop-up menus. Well, let me put your



Remember me? Shore ya do...it's Leon Shore. Come visit my house whenever you need a friend or a guide.

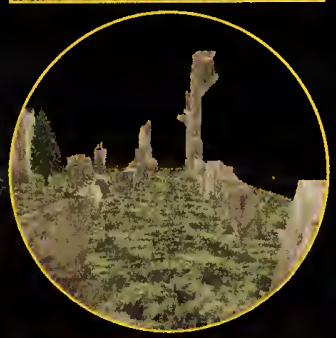
Behind The Screams...

While the first King's Field was a phenomenal success, ASCII wasn't satisfied with just putting out a sequel with the same great features that made KF I a hit. So they put their best American team on the project working directly with From Software, Inc. of Japan to make King's Field II the biggest, best, blow out game of the year!

mind at ease. ASCII did leave in some of the already refined elements that made the first King's Field a roaring success. The intuitive control and pop-up menus remain unchanged for the most part. ASCII did, however, add a feature to the "System" menu which allows you to change the default button configuration to anything you want. This feature gives you just that much more control over how your game acts and reacts.

This much anticipated sequel to King's Field would have done incredibly well even without the vast improvements. Just on the promise of the same quality in the beautiful 3D polygon graphics and intensity of gameplay, King's Field II would have been a sell out game! But with improved sound, graphics, and storyline; along with a humongous world to explore, King's Field II is destined to be one of the top sellers this holiday season and well into next year!

I would wish good luck to you, Prince Austin Lyle Forester...but you're gonna' need a lot more than luck to make it through this one!



Inside Edge

King's Field II is immense. Your only hope of exploring the whole thing is to acquire the *Pixy Map* early on in your quest. (It's an automap which maps everywhere you go in the game.) Each village, castle, dungeon, and underground has its own map, so figuring out where you've been is as easy as pulling up your items menu!

To find the *Pixy Map*, you must make your way through *Varde's Forest* (a maze just beyond the castle in the first town). Once you've made it through the maze, you'll receive this map along with another important item.

To receive the *Pixy Map*, you will have to talk to *Varde*, the character that holds it. It is important to speak with every character you come across every time you see them. Characters change what they say after you've visited other villages and villagers, so talk to them often! For reference, your character keeps a log of all conversations automatically.

Behind The SCREAMS

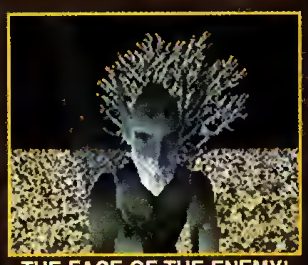
It all started with a wish list. Design and Layout coordinator David "Commander" Silviera and Production overseer, Mark "The Monk" Johnson (doubling as ASCII's video game consultants and game masters) were given the opportunity to make a wish list for everything they wished had been in KF I and everything that could have been better that was already in the game. Combining feedback information from the consumers via the On-line News Groups, registration card information, and their own ideas, they put together a list of upgrades that would make the ultimate game. After presenting the list to From Software, Inc. of Japan, ASCII also added Austin (as in "Prince") Leininger to the ranks of the KF II team to help implement the upgrades and make KF II a smashing success.

"Rewriting the Japanese script was a blast," quoth Austin. "It was the opportunity to actually create an entire script for a video game only limited by the original story line from Japan."

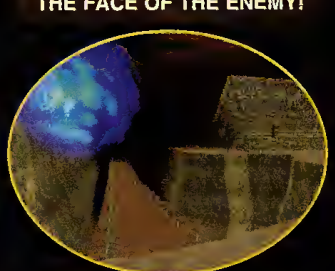
The improvements over King's Field I include...

- Larger world to explore.
- Outside areas of exploration.
- CD Quality music and sounds.
- Improved character definition and dialog.
- Enhanced storyline and plot.
- More fearsome enemies.
- Enhanced weapons and magics.

And Much, Much MORE!



THE FACE OF THE ENEMY!



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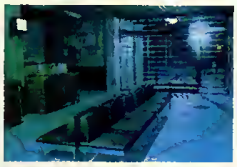
Resident Evil 2

Without a doubt, this is the most hotly anticipated sequel of the year, but can Capcom live up to its own success?

Format: **PlayStation**
Publisher: **Capcom**
Developer: **Capcom**
Release Date: **TBA**
Origin: **Japan**



An empty police HQ... until the zombies arrive

Picking up where the original left off, the sequel is set in 1998 in Racoon City, where a medical corporation, Umbrella, is performing some dubious experiments on humans, and the arrest of several Umbrella execs has coincided with an outbreak of serial murder. Once again, it's the result of a plague of zombies, but this time they're attacking police HQ, and in danger of overrunning the entire city.

The story may smack of *Dawn of the Dead* meets *Assault on Precinct 13* but the game follows the same winning format as the first *Resident Evil — Alone in the Dark* derived prerendered scenery, and plenty of guns and gore. New features include the ability to change your characters clothes, opting, for instance, for a police uniform with bullet-proof vest.

Resident Evil 2 has more locations, more weapons, more zombies and more bloody action. With the success of the original, how can it fail? ng

The new batch of zombies are mutant policemen. Plenty more gore all round

Rev Limit

Seta's N64 answer to *Daytona* and *Ridge Racer* flies by the competition

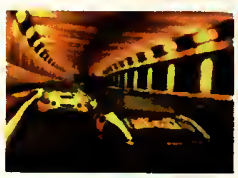
Format: **Nintendo 64**
Publisher: **Seta**
Developer: **Seta**
Release Date: **TBA**
Origin: **Japan**

As expected, the graphics in *Rev Limit* play like a full-blown demonstration of the N64's awesome graphic capabilities

Looking somewhat like an N64 version of *Ridge Racer*, Seta's *Rev Limit* appears to place as much of an emphasis on driving as it does on racing — each car has different weight and tires, which affects ground friction and handling.

Rather than some wildly outrageous spin or crash, followed by returning your car to the track completely unharmed, as is the norm, contact with other cars in *Rev Limit* results in realistic damage. It looks as if some genuine race tactics will be called for, rather than the abstract gaming skills demanded by typical racers.

The game offers three different modes of play. The sprint race option offers races of between three and ten laps, while long distance races run between 20 and 50 laps with pit stops. The third mode gives the player a straight road to drive down to test racing and close-quarters handling up against other cars. ng



Seta's racers not only look more like real cars, they drive like them, too

WICKEDLY FAST 3D, WINDOWS & VIDEO

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Toshinden URA

The 3D brawler that originally made PlayStation a must-have is back — but this time as a special edition specifically designed for Sega's Saturn

Toshinden URA blends fighters from Toshinden 1 end 2, gives them e completely new look, then edde e couple of new cherecters

A yeer ago, meny described Toshinden ee PleyStation's enswer to Virtue Fighter. But now the two gemes shere e system, who's on top?

Takara has clearly committed itself to the Saturn platform

Format: **Saturn**
Publisher: **Takara**
Developer: **Takara**
Release Date: **TBA (Japan)**
Origin: **Japan**

Toshinden S (known as *Toshinden Remix* in the U.S.) for Saturn suffered disappointing sales in Japan. There are a couple of theories to explain this: first, its characters were too heavily associated with the PlayStation — Ellis, for example, was used in Japanese ads in much the same way that Sophia was featured in the U.S. PlayStation campaign. Second, *Toshinden S* was a port (rumor has it the developers simply used a C++ version of the *Toshinden* code, with little or no attempt to use any of the Saturn's features), and competition from *Virtua Fighter 2*, with its clearly superior high-resolution graphics, simply gave the public no reason to look twice.

In response, Takara is planning a new line of Toshinden products specifically designed for Saturn called *Sega Saturn Toshinden World*, of which *Toshinden URA*, or *Ultra Revenge Attack*, is the first title.

For *URA*, Takara has completely redesigned the old characters and added two new ones for a total of eleven fighters. In addition, new boss characters have been designed, including a mysterious killer robot named Toshinhei, around whom the game's story, such as it is, revolves.

The most powerful

fighter in the world has been murdered, and the killer is slowly eliminating all witnesses to the crime. In order to protect himself, one of the witnesses stole a prototype robot fighter from the police and sent it to combat the best fighters in the world to gather data on techniques.

The Saturn and PlayStation are neck and neck in Japan, and Takara has clearly committed itself to the platform. *URA* is high-resolution, fast, and designed from the ground up specifically for Saturn, not ported from some other system.

Virtua Fighter 2 is no longer the only brawler in town.

Eiji, or "Ripper"? All the fighters heve been completely reworked

These early screens show e merked improvement over Toshinden S

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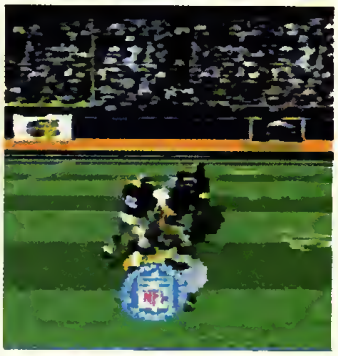
NFL GameDay '97

Format: **PlayStation**
Publisher: **Sony Sports**
Developer: **Sony Sports**
Release Date: **November**
Origin: **U.S.**

Sony Sports' upgrade to last year's best-selling title is looking better than ever, but now that *Madden*'s back in town, will good looks be enough to take the title?

Although thanks to the poor materiels supplied by Sony, these aren't the greatest screens we've ever run, trust us: the actual game looks as good as any football sim we've ever seen, bar none



The playbook has been completely updated, new players have been added — and is that a hint of *GameBreaker* mud we see?

SCEA is getting ready to release the follow-up to 1996's "*Madden* Killer"

At one point, the original *NFL GameDay* was the single best-selling title ever for PlayStation, (it was eventually unseated by Capcom's *Resident Evil*). In fact it was so good, it forced EA Sports to completely re-evaluate the position of *Madden '96*, delaying the 32-bit debut of what had been the undisputed king of console football sims for an entire year. Now SCEA is getting ready to release the follow-up to its "*Madden* killer."

There has been an interim step: *NCAA GameBreaker* used an upgrade of the *GameDay* engine with impressive results. *GameBreaker* runs some 20% faster than *GameDay*, uses an AI that learns which plays are used frequently, and even sports details like players' uniforms getting dirtier as they wrestle in the mud.

GameDay '97 will in all likelihood be a better game for the experience of its college cousin. The frame rate is exceptionally high (enabling even smoother animation) the playbook has been updated, and of course, all the latest teams, players, and stats are in.

This should be an exciting fall for console quarterbacks. *GameDay* faces stiff competition from the revised *Madden '97*, and even Acclaim's latest *Quarterback Club* is looking good. So can *GameDay* stay aheadof the pack? Time will tell. ng

Yup, it's another *GameDay*, all set to eat up the best-seller lists for another year

Last year's engine has been tuned and refined, and some new options have been added, but it's still the same great game underneath

The precise physics of your ball hitting the pins is so technically advanced and graphically dazzling, you'll be bowled over!

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Lawrence Neves, Senior Editor Game Pro
"Perfect Weapon may very well end up as one of the most unique and exciting products to hit the PlayStation this year! "
Greg Off, Editor-In-Chief, PS Extreme
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Pro-Yakkyu King

Imagineer presents one of the Nintendo 64's first Japanese sports games — but can it step up the plate in the U.S.?

Play on little guy! *Pro-Yakkyu King* uses the big-headed characters the Japanese are known for, but will U.S. gamers like 'em?

Real players from the Japanese league are used, and mostly realistic play mechanics. Aim with your head when you slide — you can't miss

Given the small number of titles available for N64, rumor has it that Nintendo may pick this up for U.S. distribution

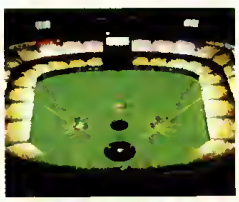
Format:	N64
Publisher:	Imagineer
Developer:	Imagineer
Release Date:	November (Japan)
Origin:	Japan

For the record, "yakkyu" is the Japanese word for baseball. This latest N64 release, one of only a few sports titles announced for Nintendo's 64-bit system, smacks of everything Mr. Yamauchi seems to have planned for the system: namely, it uses polygonal characters in a true 3D environment, and it's cloyingly, oppressively cute.

In this case, however, the cuteness may be deceptive. While all the players are the big-headed, soft-shouldered, superdeformed little guys the Japanese can't seem to get enough of, each player is actually named after real players in the Japanese league and performance is based on real stats. All twelve Japanese teams are included, along with two additional "fantasy" teams. Also included in the package are options for editing existing teams or creating one from scratch. Other game options include exhibition, pennant, and training modes. During training modes, existing players can be given extra practice and improve their stats. In addition, thanks to the N64's numerous joypad ports, the game fully supports up to four players at the same time, either all on one team, two-on-two, or any mix.

Then again, maybe the cuteness isn't so deceptive after all. While most of the game's mechanics appear to be fairly realistic, the players are prone to strange histrionics and melodramatic facial expressions. Furthermore, players can become "stressed out" and lose much of their ability to play. Exactly how this differs from the kind of traditional fatigue modifier found in many sports games is unclear, but the approach is certainly unique.

Whether or not this game will ever be released in the U.S., and in what form, is up in the air. However, given the limited number of titles available for N64, rumor has it that Nintendo, themselves, may pick this up for Stateside distribution. ng



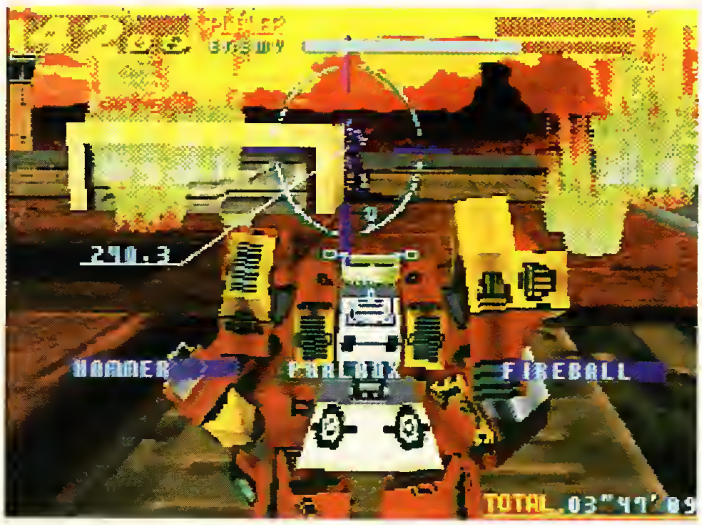
Pro-Yakkyu King features real stadiums (bet you don't recognize them)

On the other hand, the "cute" approach leads to some odd expressions

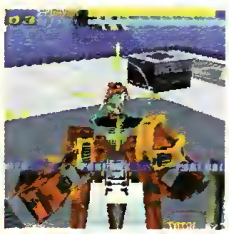
Virtual On

Sega continues to push the Saturn envelope with conversions of arcade titles. But can the standard of *VF2* and *Sega Rally* be maintained?

Format:	**Saturn**
Publisher:	**Sega**
Developer:	**AM3**
Release Date:	**November**
Origin:	**Japan**



Buildings double es obstecles end provide protection, but tactical movement takes e backseat to trigger-heevy ection, es meny projectile weepons cleave e wide path of destruction. Jumping elso enebles the pleyer to hover briefly



A veriety of in-close end distence attecks lends e unique style to combat.

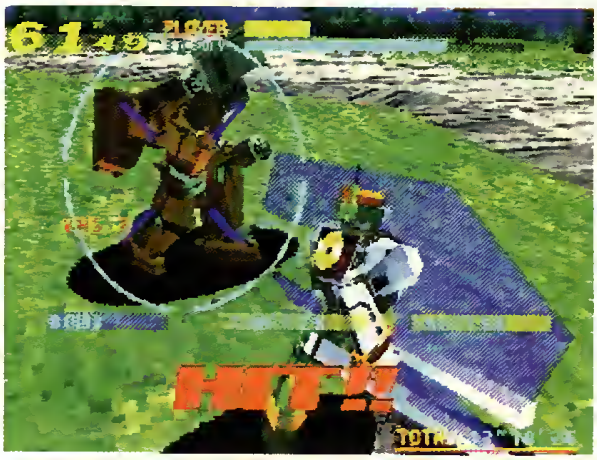
In the brief history of Saturn titles, AM2 and AM3's exclusive coin-op conversions are undoubtedly the brightest stars in a galaxy where black holes are readily apparent. With third party support seeming to slip, Sega's success depends more and more on the output of these development teams, and arcade hardware is evolving rapidly beyond the means of 32-bit power. *Virtual On* pushes these dilemmas aside, however.

Players choose one of eight mech characters, each with varied weapons and abilities. From a third-person view, players compete on a relatively small 3D battlefield one-on-one against a CPU opponent or another player. Without a dual-screen arcade cabinet, head-to-head play runs on the Saturn via a split screen — an unsubtle solution that hampers the action by letting opponents see each other at all times. Control also seems to suffer from the loss of the arcade version's two joysticks, and arcade fans will find rotating with the D-pad somewhat annoying. Apparently, Sega had some initial plans to make the home version compatible with Sega's dual-stick analog controller, but it seems that time constraints have made such a feature unworkable.

Like the early version of *Fighting Vipers*, the graphics thus far are not as polished as the arcade version, but the engine is well duplicated, and *Fighting Vipers* cleaned up to a remarkable degree by the final product.

With *Virtual On*, AM3 looks as if it is keeping the Saturn up to pace with Sega's coin-op development. The next great hurdle, however, will be for AM2 to convert *Virtua Fighter 3* from the Model 3 board — an entirely different proposition. ng

With *Virtual On*, AM3 looks as if it is keeping the Saturn up to pace with Sega's coin-op development



Unlike *Battletech*'s stumpy bi-peds, these engines of destruction ere from e more graceful enime school, like something out of *Voltron*

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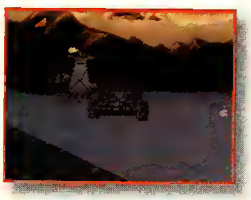
"Gawd bless Necrodome™ says Action Ab!

Actian Ab, actian game and weap ans enthusiast

Ah just love action games, 'specially the kind that makes me sweat like a pig in heat. Ah love action games even more than my favert food, dinner.

Lately, lotsa games seem ho-hum. But not NECRODOME. This new game composts two of my favert things: trucks 'n guns.

Ah had so much fun ah can't believe it. You gotta git all them scumbags with your cannons before they git you. But watch out 'cause every time ah thought ah had 'em, my truck blowed up!



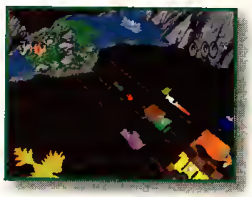
You can even have a buddy shoot out of your back turret while you race. But if yur like me, you don't want nobody near yur turret — let alone in it. If NECRODOME ain't the biggest game o' the year, then ah don't know my hole from a head in the ground."

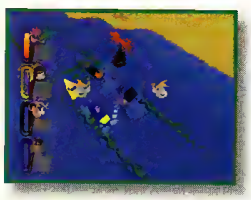
"Omigod! Dare Devil Derby 3D™ is way cool!

Lips Akimba, major babe and sports enthusiast

I love racing games, okay? And unlike my choice of men, I've got real high standards. So when people said, 'Lips, you gotta play DARE DEVIL DERBY, the new 3D multi-player racing game from Mindscape' I said, 'Puh-lease!'

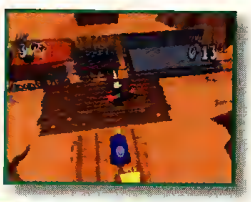
But then, whoa! I'm all, this game is totally awesome! I played it so much that all my fingernails broke off! My boyfriend Marty said my nails were fake, just like me. So I kept beating that ignorant puke at DDD!





Then six of Marty's friends showed up, so I plugged all eight of us into multi-taps and we raced against each other! It was way beyond amazing!

I played it like 14 hours straight and never ever thought about eating or going to the bathroom. Can you believe it? I know! I couldn't either!"

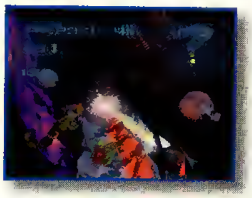


"Starwinder™ is so fast, it'll make you hurl!

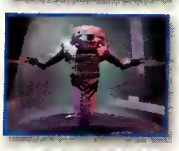
Rocket Rannie, action reviewer dude at large

Just popped in a toastie version of the new PlayStation™ title STARWINDER: THE ULTIMATE SPACE RACE. Dudes and Dudettes, this game is kickin'!

Right off the hip, I noticed the amazing buzz from the free flight control. The Ronster was flying his ship in and out of the rails...for real.



If you're into speed, this is the treat for you. MAXIMUM SPEEDATUDE! My buddy Fred hurled just watching the game.



And there's lots more! Usually, I blow by the cut scenes, but all those clips of alien pilots were a major trip. I was laughing so hard, I almost blew lunch outta my nose!"

The Ronster says check it out!"

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Steel Legions

Multiplayer gaming over a PC network is big news. Now, a Scottish company with a background in classified work for the U.S. space program and the U.K.'s defense department prepares for gaming lift-off

Digitnl Animations' forthcoming *Steel Legions* will be thn latest PC gamn to tekn on the likns of *MechWarrior*. A company traditionnlly renowned for its profnssionnl 3D nnimations, expect the FMV in *Stnnl Legions* to set new standards

"*Steel Legions* is basically a game of AIs, with players coming in to replace one of the AIs. This way, it's always fully populated"

Jim Robertson, AI Guru

Format:	**PC**
Publisher:	**Eidos**
Developer:	**Digital Animations**
Release Date:	**November**
Origin:	**Scotland**

In the year 500 BC in the reign of King Ho Lu in ancient China, a general named Sun Tzu Wu wrote a book entitled *The Art Of War*. "The supreme excellence is not to win a hundred victories in a hundred battles" he argued, but "to subdue the armies of your enemies without even having to fight them."

In the 13 short chapters of *The Art Of War*, Sun Tzu Wu wrote many other wise things which any future players of *Steel Legions* would be well advised to study. Although Sun Tzu Wu, or indeed *Steel Legions* are not commonly used conversation pieces, the latter has the potential to become famous in the annals of computer gaming history. And if the programmers, graphic artists, marketers and architects among the staff of Digital Animations get their way, Sun Tzu Wu will become required reading for all players of their games.

Those familiar with Digital Animations will probably have viewed one of its $75,000-plus 3D-animated corporate videos extolling the virtue of this mega-corporation or that new world-saving widget. Alternatively, the names Steve Doyle (electronic engineer), Jamie Reid (Windows guru) or Jim Robertson (AI-neural network expert) may be instantly recognizable to anyone who's ever spent any time at the U.K.'s NEL (National Engineering Laboratories), one of the British Government's most high-powered centers for the study of supercomputing, parallel processing and artificial life. This is the sort of

Cnn e small Scottish dnveloper really competn on thn world gaming stagn? Eidos bets it can

ng alphas

Jim Robertson (left), Digital Animations' AI guru, and Steve Doyle (right), are responsible for the generation of *Steel Legions'* artificial intelligence

place where they routinely produce 3D visualizations of the inside of battle tanks for the army, space shuttle missions for NASA, or the cockpits of the futuristic aircraft which will be dogfighting high above the battlefields of World War III.

It's the sort of work which sounds tremendously exciting but which, in its actual execution, lacks the true escapism of computer and roleplay gaming — the sort of work which Steve, Jim and Jamie were all gagging to do but were destined never to taste. Until, that is, they met Catriona Paton, the sales and marketing director with whom they now work.

Catriona not only convinced them that they could write the kind of stunning games they'd always wanted to play but had never found on the shelves of their local computer store, but she also envisaged creating the greatest online game yet seen.

Digital Animations has been keeping details about the game itself close to its chest, but it will essentially be a network battle strategy game along similar lines to the Activision smash hit *MechWarrior 2*.

Steel Legions' main strength, however, could well lie in its unusual use of AI for governing the battle scenarios. Next Generation was shown about eight minutes of prerendered footage before witnessing some of the game's realtime features. "Look at this," says Steve, plumping down at a terminal. "We're not supposed to be using any of our terminals at the moment — the graphics guys have got them all in rendering mode — but you should see this." It's a neat program which generates a fresh landscape for each game of *Steel Legions*, so that no matter how many times you play it — even if you always play in the jungle or the city every day for a year — you'll never get the same battlefield twice.

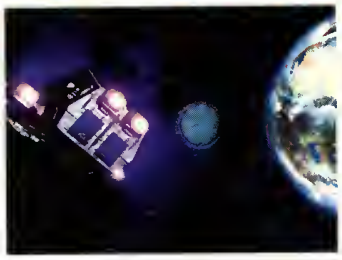
There are just 16 people working to get *Steel Legions* out of the door by November, but writing the game exclusively for the Windows 95 platform saves a lot of hassle. "We don't have to worry about screen drivers or joystick drivers or whatever — it's a pure 32bit game and Microsoft takes care of all the boring bits for us," says Jamie.

The company is also taking full advantage of DirectX, Microsoft's new direct-to-the-metal set of APIs developed specifically for the games market. It is also impressed with the resilience and virtual memory capabilities of Win95. "A month ago we had a bug in the code which leaked about half a megabyte of memory for every frame we rendered, and it's a testament to Windows 95 that even with over 100 megabytes of memory allocated the game was still running," Steve grins. "Slowly, mind you, but still running. You couldn't do that on a PlayStation."

Steel Legions' characters are like real people: they have good days and bad days — they'll even talk about you behind your back

The 3D engine of *Steel Legions* looks likely to impress PC owners. Here a quad "Goliath" lumbers in the foreground while a fast recon "Goliath" lurks behind

Jim left NEL a year or so ago when they offered him early retirement, and his colleagues are only half-joking when they quip that the Government should feel uncomfortable about having so much AI know-how walking around in the private sector. Indeed, the AI running the characters in *Steel Legions* will be



***Steel Legions* comes complete with the now traditional dosage of FMV. A pilot speeds across a gantry to mount his goliath spaceship (top). The dropship prepares for a bumpy landing (above). A shot of the exterior of the base, which is under attack (left)**

"One of the first tasks I had was to delve quite deeply into military tactics and strategy"

Jim Robertson, AI Guru

like real people – characters will react differently to different inputs, they can have good days and bad days, and they'll love or loathe their commander and subordinates. If you give them good orders they'll respect you. If you give them bad orders, they'll try to frag you. They'll even talk about you behind your back.

"One of the highlights for me is that the AIs in our games aren't designed to work at their very maximum capability all the time," says Jim. "Rather, they're designed to emulate as closely as possible the characters they represent. There are situations where the AI works flat out, but in its main mode, it's working to represent ordinary humans as accurately as possible."

Behind the AI characters is neural net technology to cope with the huge inputs of which the game is capable. Neural networks, once they've finished their learning stage, are inherently quick and use much less of the processor time than other processes. "One of the first tasks I had was to delve quite deeply into military tactics and strategy, looking at the great military leaders of the past," says Jim, "as far back as Sun Tzu Wu — that guy was fantastic, the things he was saying 2,500 years ago are still applicable today." The team then programmed Wu's rules — and those of great generals like Napoleon — into its neural net and discovered that it could come up with tactics and strategies for situations that had never been directly programmed into it.

Steel Legions can be played at many different levels, depending on how players feel. Be the general at the top, taking a strategic view of the battlefield and watching the big picture, or be a grunt hunkered down in a corner of a ruined semi-detached house, wondering where your next tin of cold C-rations are coming from. Or players can be anyone in between.

With the Internet's bandwidth being too narrow to accommodate a fast-paced game, for now Digital Animations concedes that local network play will be the only feasible environment for *Steel Legions*, although it hopes to have the game running on BT's Wireplay service (in the U.K.) and possibly Dwango (in the U.S.). Then you'll never know (nor indeed *need* to know) who you're playing against.

"In *Steel Legions* the human player is a guest," adds Jim. "It's basically a game of AIs and you come in and replace one of the AIs, so it's always fully-populated."

The company is already planning interlocking games which will play in the *Steel Legions* universe. But that's for the future. For now, the team merely hopes that its first game prospers in the outside world. ng

Colin McNeb (left), and Michael Antliff (right), two of DA's head men. Expect *Steel Legions* to appear in stores in November of this year

Digital Animations' operations director Colin McNeb; sales and marketing director Catriona Paton; and creative chief Michael Antliff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Meridian 59

The 3DO Company takes a stab at creating the ultimate multiplayer online experience. Can it succeed?

***Maridian 59* is truly a self-contained world. It has its hazards (abova), its own economy (shop keeper, right), and avan its own varsion of an onlina nawsgroup (*Tha Obsidian Globe*, far right)**

MUDs have been around since the earliest days of the Internet, but as technology has gotten better (and bandwidth has gotten higher), gamers have started clamoring for a more immersive, comprehensive gaming experience than simple text can provide. And, predictably, new services are popping up to fill the need. Origin has taken one approach with *Ultima Online* (NG 21), now 3DO is coming out with its solution, *Meridian 59*.

Format:	**PC-CD ROM**
Publisher:	**3DO**
Developer:	**3DO**
Release Date:	**November**
Origin:	**U.S.**

"Sociologists reckon that the most people a person can ever really know at once is about 700, which is about the average size of a medieval town"

Mike Sellers, Online Designer

The game is a first-person, fantasy-based virtual word, resembling Bethesda's *Daggerfall* (in concept, if not in operation). Currently undergoing continuous beta testing, the world of *Meridian 59* consists of three towns, a few square miles of landscape, numerous scattered guild halls, and of course, an underworld for players to wind up in when they die. Actually, make that "worlds," plural. The system works by having parallel Meridians running on separate servers, each used by a few hundred people at a time, so that thousands can be online without overcrowding the world.

"There's some interesting sociological work that was done a long time ago which showed that the most people a person can ever really know at once is about 700," says Mike Sellers, one of 3DO's online designers, "which, it turns out, is about the average size of a medieval town. We didn't want *Meridian 59* to be like being alone in New York — lost with about a zillion people around you. We wanted each of our parallel worlds to be well-founded communities; not too small but not too large."

Like *Ultima Online*, *Meridian 59* is a TCP/IP client application. Users dial their local internet access provider,

Start by building a charactar from a wida ranga of featuras

Initially, playars can axpect to spend tima beating up on smallar varmin — not axactly haroic, but good for building up axperience

ng alphas

Hunting zombies in the graveyard is a fevorite pastime after midnight

then launch *Meridian* in much the same fashion as one would run Netscape or a newsreader.

Once connected, players can then customize their onscreen incarnation, choosing to be either male or female, varying skin tone, and selecting different hair styles, eyes, noses and chins. The characters are structured so that each player's face is presented in as high a resolution as is possible with a view to preserving the human element (different expressions can also be affected during the game), then resolution drops off in the torso and legs to preserve access speed ("Nobody cares about legs," jokes Sellers). Players then choose from a list of spells and skills, and dive in.

Adventures are generated in a number of ways. There are, for instance, two rival NPC leaders, a Princess and a Duke, and players can ally with one or the other and go on quests for them. But as with most online entities, it's mostly up to the players themselves what to do.

Gathering groups to clear an area of dangerous creatures so newcomers have a safe place to gather, for example, or mounting an expedition to the frozen wastes for an assault on the dreaded Yeti, are activities the players themselves can invent and take part in. And the world itself is planned to undergo periodic revisions: "This isn't a 'fire and forget' kind of product," Sellers explains. "We have the ability to update the world, and the game automatic downloads when you log on, so you can get new art and new areas anything else we want to add. It will change over time."

At press time, there were still many bugs to be worked out — the interface needed tweaking, and there were still some problems with latency — but the game engine itself can be upgraded automatically just like the game world, and with an open beta test, feedback is instantaneous, and definitely appreciated by the design team.

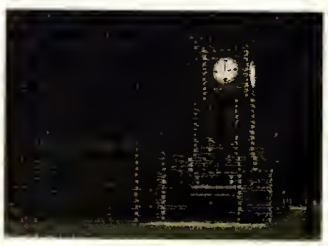
But the key to the world is the ability to role play and interact with others. Sellers concludes, "My daughter, for instance, is 15 and she plays this a lot.

A while back I came home and found she'd gotten married to some guy online, and I thought, 'Well, it's time we had a nice long talk,' but then I found out that the vows were, 'Til death do us part' — turns out it lasted about two hours." ng

A stranger on a dark road. Should you trust him or run? Your call

"My daughter is 15 and she got married to some guy online — 'Til death us do part.' Turns out it lasted about two hours"

Mike Fnord, Game Designer



The online world even extends to social constructs like weddings (far right). It's amazing what happens when you set people loose...

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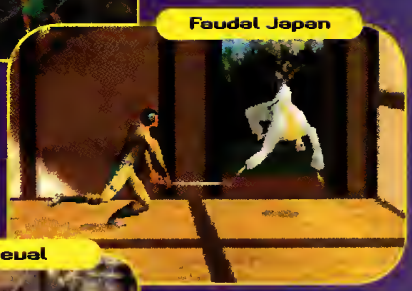

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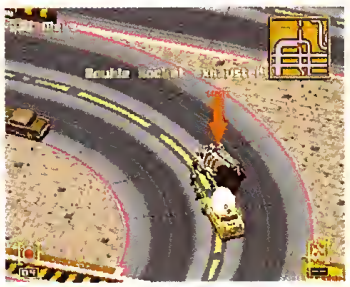
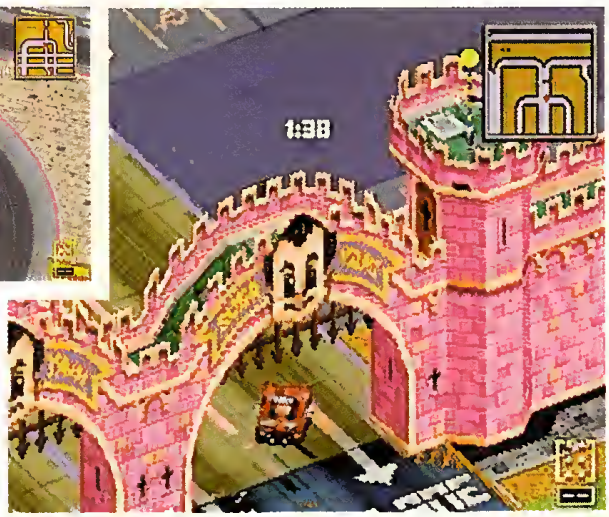
Crimewave

It's simple, there's not much strategy, and it plays like other games — so why is Eidos' latest so much fun?





As a Freelance Security Providar, you're entitled to drive around in a heavily-armed vehicle and blow stuff up — ain't life grand?

Format:	**Saturn**
Publisher:	**Eidos**
Developer:	**Eidos**
Release Date:	**November**
Origin:	**U.K.**

Crimewave isn't especially groundbreaking. A cross between *Micro Machines* and *Spy Hunter* (without the cool soundtrack), there's plenty of precedent for its style of game play.

But it's rarely been done this well. *Crimewave* gives the player the role of a new kind of cop, the Freelance Security Provider. The goal? Simple, drive around the city, waiting for the call on lethal lawbreakers in the area. When you find them, blow 'em off the road. Easy.

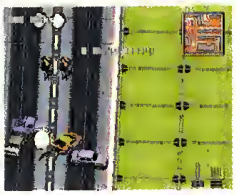
Destroyed cars yield fuel and better weapons, including rear-mounted minedroppers and oil slicks (referred to as "road lubricant"). A bounty is awarded, and when enough money is been earned, the action moves to the next stage.

The biggest hurdle is that civilian cars have to be spared (or you're fined), and that rival cops may try to destroy you and claim your bounty.

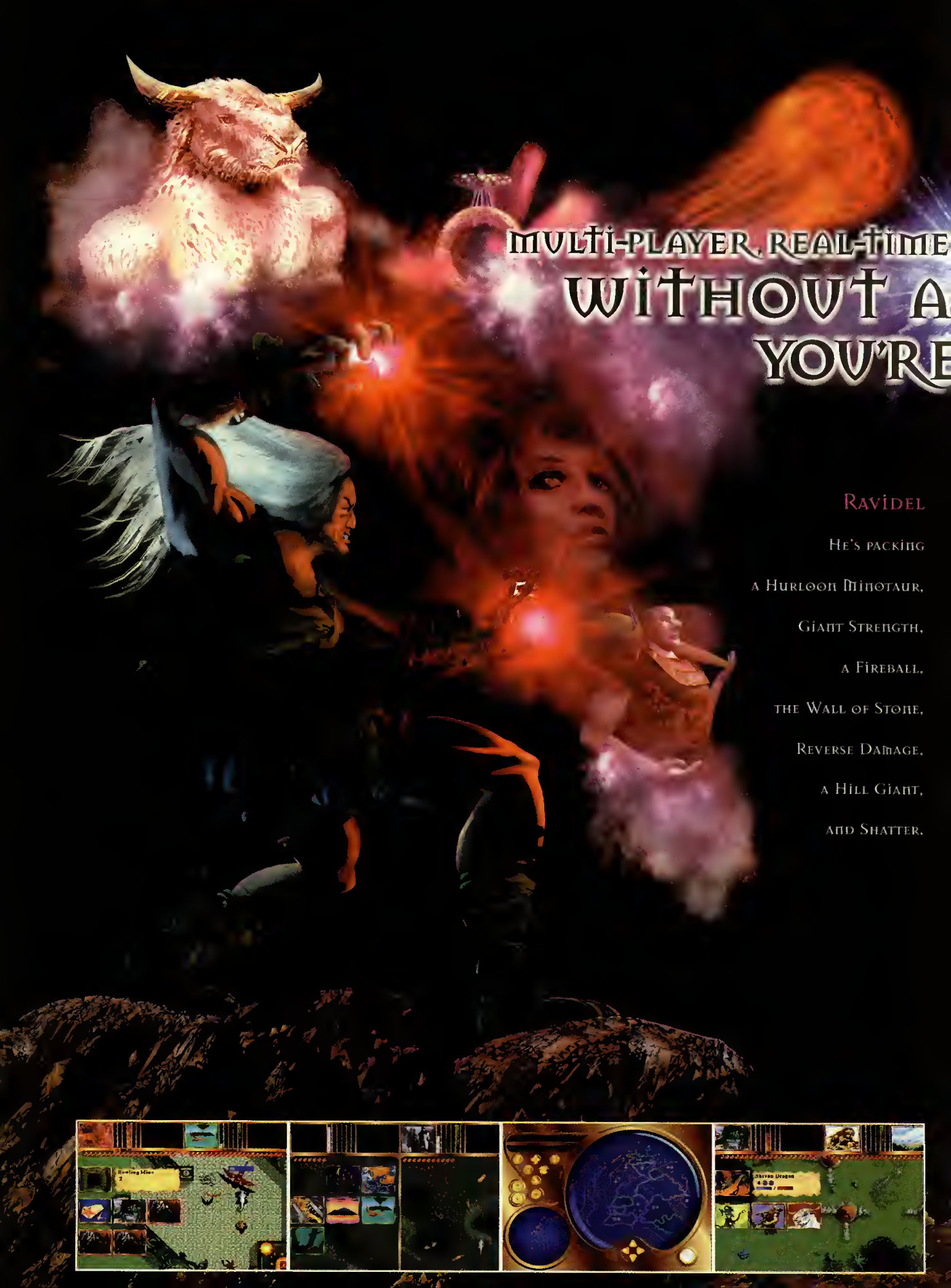
The game is played from an isometric perspective, but unlike the norm for this view, the environment is actually rendered completely in 3D. As the player's car takes the curves, the camera rotates with the car to find the best view. It takes a little getting used to, but is technically impressive, and rarely leaves the player with no idea what's happening. The control is responsive, and the level of detail is astounding. There are eight different areas, from the flashy Casino level to the more laid back Beach, but each is completely unique.

There are still some features that need tweaking: the frame rate, while high, occasionally slows to a crawl as the view spins, and the total loss of control during collisions, especially with stationary objects, is problematical. Also, since this was developed in the U.K., all the civilian cars are driving on the wrong side of the road. However, it's mostly a matter of minor adjustments, and on the whole, *Crimewave* is shaping up to be simply a blast. ng

And everything blowa up real good — oh, um, just watch out for civiliana



Watch out for rival copa — thay're all too happy to ruin your good tima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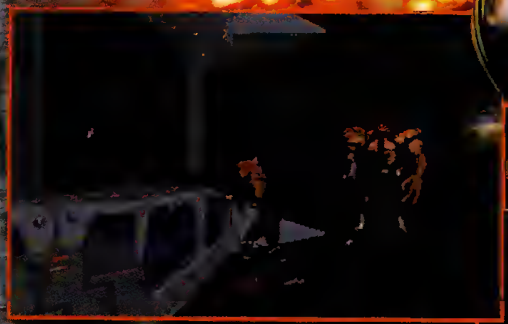
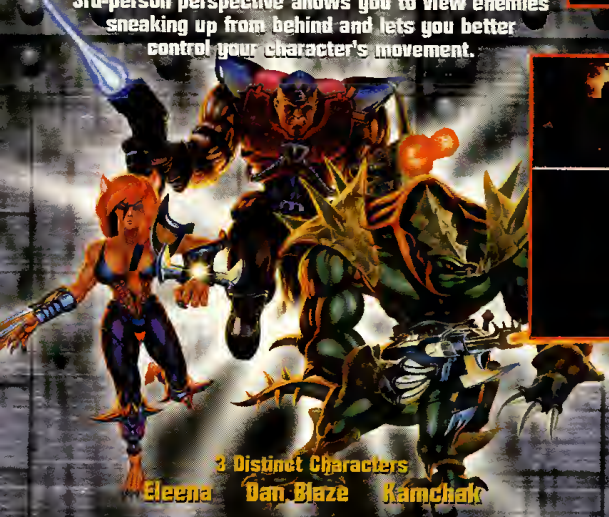


Choose from 1st- or 3rd-person player perspectives. 3rd-person perspective allows you to view enemies sneaking up from behind and lets you better control your character's movement.

Enhance gameplay with unique "picture-in-picture" views that let you swap your views, control your weapons and enemies, and see 2 areas at once.



3 Distinct Characters
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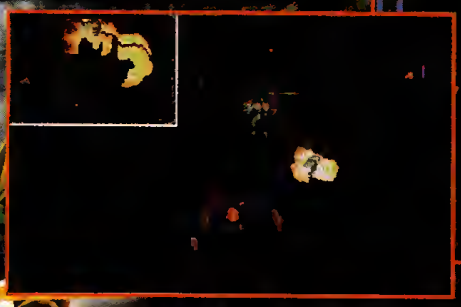

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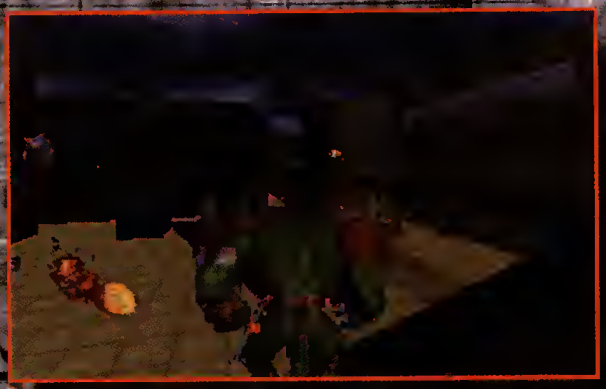

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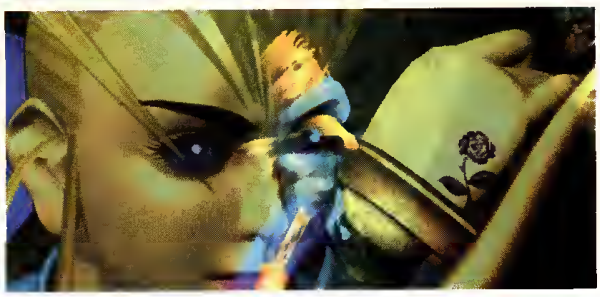


Softimage-rendered CGI (above, right) adorns *Dark Saviour*'s lavish intro and cut-scenes. This is one pretty game

Dark Saviour

Format: **Saturn**
Publisher: **TBA**
Developer: **Climax**
Release Date: **TBA**
Origin: **Japan**

Climax Entertainment is a tiny Japanese development team with a reputation for quality, not quantity. Next Generation meets the small time RPG heroes on the verge of hitting it big with Saturn

Climax Entertainment's HQ ie the Shinjuku district of downtowe Tokyo, Jepen

Climax is one of Japan's unsung development heroes. Occupying an office block near the infamous Shinjuku train station (which frequently loses bewildered tourists in its labyrinthine corridors) the company accommodates approximately 20 staff and, so far, has developed just three games.

In 1993 Sega published Climax's seminal Genesis action RPG *Landstalker* to a rapturous reception — despite the small market Sega's 16-bit machine commanded in Japan. This was Sega's answer to Nintendo's *Zelda* on the Super Famicom and proved to be a Genesis title that consumed the lives of Japan's RPG cognoscenti. This was later followed by *Ladystalker*, the curious Super NES equivalent designed with female gamers in mind. But, perhaps for this very reason, it failed to match the success of its predecessor. Now the company has returned to Sega and its new 32-bit hardware for its latest and greatest project, *Dark Saviour*.

Kan Naito, president of Climax and director of *Dark Saviour*, previously worked at Enix on the all-conquering *Dragon Quest* series (by far the most successful series of RPGs in Japan) and so understands the nuances of the Japanese RPG market.

He admits that his path into the games industry wasn't conventional, having often played truant while at school to the detriment of his education. "I missed out on so much that I had to buy school books in order

"We decided to use the Saturn's 3D abilities to include a camera with complete freedom of movement"

Shinya Nishigaki, Producer

ng alphas

Shinya Nishigaki, producar, (top) and Kan Naito, director (above) muse ovar Saturn's strangths and weaknesses

to catch up on things like math and geometry — skills I later found I needed." This, he concedes, was the hardest aspect of starting to develop for a 3D machine such as the Saturn.

Instead of being able to draw upon skills assimilated from a wide portfolio of games, Climax had experience of just two very similar games before work started on *Dark Saviour*, and its 2D heritage meant the Saturn title required learning many of the techniques from scratch.

"To be honest, we weren't at all familiar with the Saturn when we started, and that's been one of the reasons this project has taken so long," adds Naito. "Both *Landstalker* and *Dragon Quest* were essentially very flat worlds so we had to learn how to handle 3D camera work from the beginning," he explains.

Other problems encountered during the early stages of development were thrown up by the Saturn's specifications, despite Sega's technical support teams assisting them well. When the project began two years ago, the Saturn was perceived by the Japanese development community as the underdog to the PlayStation. In Naito's words, "Compared to the PlayStation, the Saturn is not very good at managing polygons and textures. Initially we had some difficulties to make the game work at a good speed. However, we finally succeeded," he proudly notes.

Overall, Naito is enthusiastic about the Saturn and its reputation for being — when pushed — a far more versatile machine than PlayStation.

The team has coded *Dark Saviour* completely in assembler, which it claims was the only way to keep things moving at speed. "The PlayStation may be better at managing polygons," continues Naito, "but you can't write in assembler, you can only use C and we just don't know if *Dark Saviour* could be done in C. The PlayStation's polygons become easily distorted, too — especially when big polygons come close to the camera." Still, this is little for Naito to lose sleep over now since *Dark Saviour* will only be appearing on the Saturn — making it a valuable weapon for Sega in the battle against PlayStation and Nintendo 64.

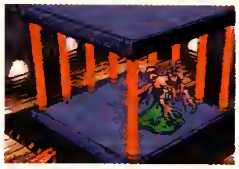
But coding in assembler has its problems and, particularly on the Saturn, there will always be the headache of juggling two CPUs. Climax's director concedes that handling 3D graphics with two CPUs is no easy job, despite the results that Sega's internal teams have delivered with *Virtua Fighter 2*, *Sega Rally*, and the hotly tipped revamped version of *Daytona USA*, soon to be unveiled.

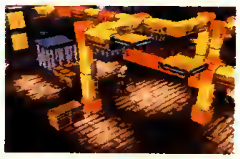
"Even if you have two CPUs it is difficult to use 100% of the hardware specifications," Naito explains, "because data has to be shared between them and the probability of them interfering with each other becomes higher. One CPU has to wait for the other to finish and it's a very complex process. We do not exploit the twin CPUs 100% but we succeeded in using them in a very efficient way."

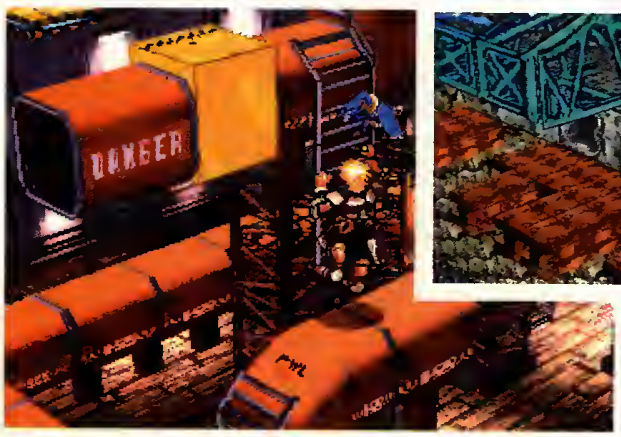
The inspiration for *Dark Saviour* naturally comes from *Landstalker*,

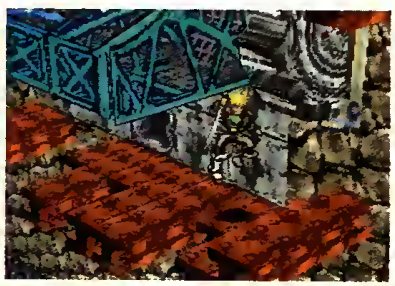
"Sony's PlayStation may be better at 3D, but you can't write in assembler — and the polygons easily distort"

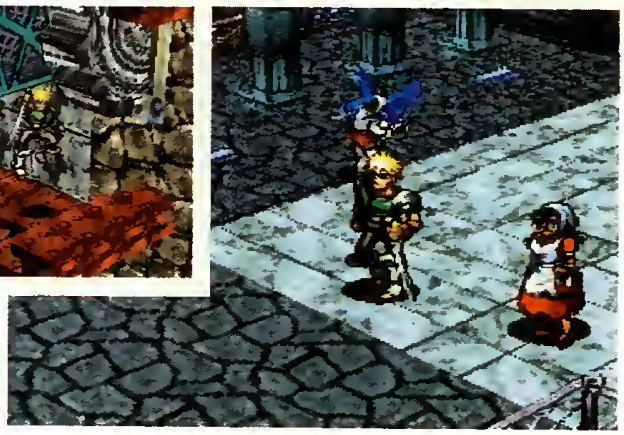
Kan Naito, Director



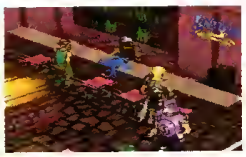


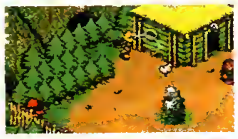


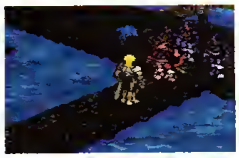




Dark Saviour* includas mora then 300 maps, all randered in raaltime. The gama also has the benefit of three indapendant storylinas that Climax's director Ken Naito has labored upon for tha past two yaars. The gama camara can be controlled by the playar, as in Shigaru Miyamoto's *Super Mario 64







Talking (end, of course, fighting) with other cherectere ie essentiel

itself a project derived from what the company's director describes as his own childhood fascination with miniature toys such as plastic models, trains, and action men type figures.

Naito had experimented with radio-controlled toy figures and had then run tests on his PC which gave him a basis from which to start developing games. *Dark Saviour* was the logical progression once 32-bit technology arrived to match his ambition.

Dark Saviour's producer, Shinya Nishigaki, admits that the game has some parts in common with *Landstalker* but the company had wanted it to look more like a movie than its 16-bit effort. "We pioneered the quarter view in *Landstalker*," he explains, "and decided this should become our speciality. As soon as the Saturn was released we decided to use the machine's 3D abilities to include a camera with complete freedom of movement. Our main desire was also to make a style of game that nobody had done before. So, we decided to use a 3D world with parallel stories."

The implementation of this proved to be a lot more work than the team bargained for. Starting work on the project in December 1994, the game was forecast to be released in May of this year, but the team hit problems due to the sheer size of the title.

Now far bigger than previously planned, *Dark Saviour* was scheduled to hit Japanese streets at the end of August (the U.S. version will be released later in the year). Shinya Nishigaki puts the delays down to the game environments requiring modeling in polygons, while rendering and applying textures to these has taken longer than expected. "We also spent lots of time making the main camera system. We've called this system 'Hyperion Perspective' and our director took no less than six months to make it! After this, we had to make more than 300 maps, each one in 3D."

To help get reach deadline, Climax has relied upon freelance graphic designers, music composers, voice actresses, and scenario writers. The team also hired a famous Japanese TV script writer to pen the scenario for *Dark Saviour*.

However, the team has had technical disadvantages when compared to high-powered rivals such as Square Soft and Enix. Currently, Climax doesn't rely on a huge network of Silicon Graphics machines equipped with SoftImage. Instead, it uses a less well-known 3D software package called Cyclone and its own tools, although it did employ a freelance SoftImage artist (Masayuki Hasegawa, who designed the stunning intro sequence for Sega's *Clockwork Knight*) for the intro and cut-scenes.

One of *Dark Saviour*'s most interesting features signposts the differences in videogame culture between Japan and the rest of the world. In a similar way to *Landstalker*, Climax has designed its first Saturn game to have three parallel stories.

"People who play a game a second time are numerous in Japan, but it's not interesting to play a game twice if the story is the same," explains Naito. "So, for *Dark Saviour* we've included a practice story, a main story and the third more action-orientated stage." The first part of *Dark Saviour* includes either six or seven stages and takes about eight hours to complete. The second includes ten stages and will be a romantic action story in which a heroine will appear. Even though the third story is shorter, it is tough and Climax estimates that to complete the game will take most gamers at least 30 hours.

When pressed for future plans the company's director stressed to Next Generation that he doesn't want to continue making just RPGs. "I have to admit, *Dark Saviour* was a difficult game to make. In the future, I'd really like to do a racing game on the Saturn or PlayStation. I really like cars, and I think we could make some genuine innovations, too."

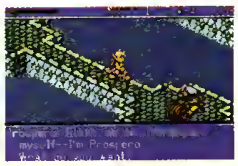
Next Generation wishes this small, dedicated company well. ng

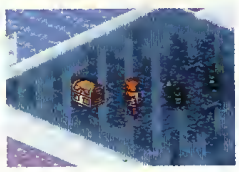
The teem has developed its own custom Saturn toole epecifically for *DS*

Backtracking

Released in late 1992 in Japan to widespread acclaim (and a year later in the U.S.), Climax's *Landstalker* was one of the Genesis's finest hours. Combining an extensive quest with some unusual isometric graphics, it was an action RPG with a strong storyline and gameplay closer to Nintendo's *Zelda* than previous Genesis RPGs such as *Shining Force*.

The company's second game, *Ladystalker*, appeared on the Super NES about two years later. It failed to have the same impact, though, mainly because it was more comic in tone and was designed with female players in mind.





***Landstalker* (top) wee the game that put Climax on the mep end helped the eiling Geneeie in Japen. Pseudo-sequel, *Ladyetelker* (above), was releeeed for the Super Nintendo**

HE'S FLIRTING

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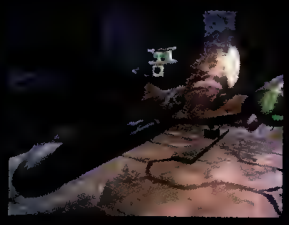

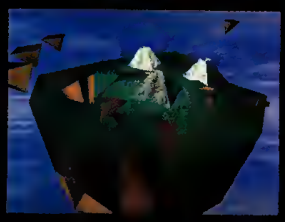

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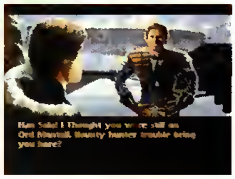
Shadows of the Empire

There's no doubting the force of Nintendo 64, but can a game that tries to be all things to all gamers really succeed?

Han Solo or Dash Render? Actuelly, it's Han. But you'd be forgiven for getting the two confused

Of course, *Shadows of the Empire* showcases all N64's graphic effects



Format:	**Nintendo 64**
Publisher:	**Nintendo**
Developer:	**LucasArts**
Release Date:	**December 2**
Origin:	**U.S.**

Nintendo is counting heavily on the power of the Force. Indeed, the Star Wars universe (spawned from the mind of George Lucas) has generated so much money from licensing alone, that the grand total could probably fund the construction of a real-life Death Star. Nintendo obviously realizes this, and in the absence of any other "big name" games from the non-Nintendo universe to bolster N64's meagre line up, it is *Shadows of the Empire* that will sit next to *Super Mario 64* as the systems most marketable property — at least until the release of the *Mortal Kombat Trilogy* next year.

As with previous *Star Wars* titles, the storyline actually sets up good gameplay. The plot for *Shadows* is taken directly from the series of novels of the same name (in the *Star Wars* chronology, the game falls between *The Empire Strikes Back* and *Return of the Jedi)* but don't expect to play as Luke or any of the other familiar headliners. Instead, *Shadows* introduces a new character, Dash Rendar, and elevates him to hero.

Cut from the same roguish mold as Han Solo (even his ship bears a striking resemblance to the Millennium Falcon) Dash is no Jedi. But it is in Dash's shoes that the player find himself as the adventure begins on the ice planet Hoth at the scene of the Imperial invasion. In later levels players cross the galaxy in pursuit of Boba Fett the bounty hunter and Xizor, a new agent of the Emperor, visiting familiar Star Wars landmarks, such as during a Swoopbike race through the streets of Mos Eisley and into Beggar's Canyon.

Essentially the game design is *Dark Forces* meets *Tie Fighter* meets *Rebel Assault*. According to Jim Merrick, a Software Engineer at Nintendo, the levels operate on either

Is there enything better then shooting TIE fighters?

The laser blast sound effects were sampled directly from the LucasFilm library

ng alphas

All that's missing from the *Doom*-style first-person sequences is a light saber. It's easy to forget that you're not a Jedi

a "walking, flight, or rail" engine. Each of the ten levels of gameplay alternate between first or third-person shooting, and traditional galactic dogfights. The only ones that really disappoint are the "rail" levels, such as the starship battle in an asteroid field, in which Dash's flight path is completely computer navigated. But don't be too disappointed, even when the game control is out of players' hands, this is still the Star Wars world.

"There are a lot of things going on in *Shadows* that have to remain true to something Star Wars fans already have a frame of reference for," explains Merrick. The laser blast sound effects, for instance, were sampled directly from the LucasFilm library. "Gamers already have a predetermined expectation of what a Star Wars title has to be, and to hit that mark is a tough challenge," Merrick notes. But Nintendo is confident that LucasArts has risen to the challenge.

New locations like Ord Mandell and Xizor's palace, which have never been seen on film, gave the designers more freedom, and add some variation to the game. From the third-person view in Ord Mandell, players must shoot oncoming enemies as they move on a 3D flatbed train. In Xizor's palace, a *Duke Nukem*-style jetpack gives players a chance to fly around and hover in true 3D space.

At about 90% complete, all the Star Wars trappings have been fully implemented into *Shadows of the Empire* — the signature yellow story text scrolls across a starscape to set several stages, and much of the same orchestrated music used in the films fills the backgrounds.

"When you think of Star Wars, you think of a fully orchestral John Williams soundtrack," notes Merrick. "Most videogames today use synthesized music, but even a rack of wonderful synthesizers isn't going to sound like what you remember from the film. So *Shadows'* is the only game that we're offering right now that has a pre-recorded — or digitized — soundtrack. This is something that people said couldn't be done with a cartridge. But here's evidence to the contrary, and it sounds pretty good."

"Gamers already have a firm expectation of what a Star Wars title has to be, and to hit that mark is a tough challenge."

Jim Merrick, Software Engineer

It is Interesting to note that *Shadows of the Empire* will be the first N64 game released not developed by Nintendo. And while the title still has a while to go until completion, it does look as if it will fall below the standard of *Mario, Pilot Wings,* and *Wave Rave*. Will any other third parties match the impressive standards set by Nintendo's in-house teams? Only time will tell. ng

At a 90% stage of completion, *Shadows of the Empire* doesn't seem to be as impressive as *Mario 64, Pilot Wings,* or *Wave Race* — either graphically, or from a gameplay point of view. But is this because LucasArts failed to deliver? Or is it testament to the awesome power of Nintendo's in-house teams?

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Killer Instinct Gold

Love it or loathe it, there's no denying its popularity. But can *KI* really do for N64 what *Virtua Fighter 2* did for Saturn?

In the nearly-complete version played at press time, the characters blur when zoomed in on, but Lobb insists this small glitch will be minimized in the final version

Format:	**Nintendo 64**
Publisher:	**Nintendo**
Developer:	**Rare/Nintendo**
Release Date:	**November 25**
Origin:	**U.K.**

The original *Killer Instinct* coin-op was released in 1994 during the lull between *Mortal Kombat 2* and *Mortal Kombat 3*, and captured the mindshare of teenage quarter-droppers looking to master thirty-hit combos. Nintendo now offers *Killer Instinct Gold* in the hope of wooing these fans into buying an N64.

Killer Instinct 2 and *KI Gold* shared some development time at Rare, so it's no surprise that both games deliver similar visual effects, are based on the same graphic engine, and feature an identical character roster. Returning fighters include Orchid, Fulgore, Sabrewulf, Spinal, Jago, T.J. Combo, and Glacius. The new *KI2* characters also appear, Kim Wu, Tusk, Maya, and the boss, Gargos. Supposedly, no new combatants were created for *KI Gold*, but Nintendo offers a firm "no comment" on the subject of hidden characters. (We suspect that missing *KI* alumni Eyedol, Chief Thunder, Cinder, and Riptor are buried in there somewhere).

Graphically the game looks pretty much the same as it did in the arcade, with the addition of some quasi-interactive 3D backgrounds. "There are more 'knock-offs' in the new levels," points out Nintendo's Ken Lobb, referring to the places where it's possible to send characters plunging from great heights. "Kim Wu's stage is probably the coolest," Lobb boasts, "as the losing character bounces off the side of a mountain on the way down."

"There are more 'knock-offs' in the new levels. Kim Wu's stage is probably the coolest."

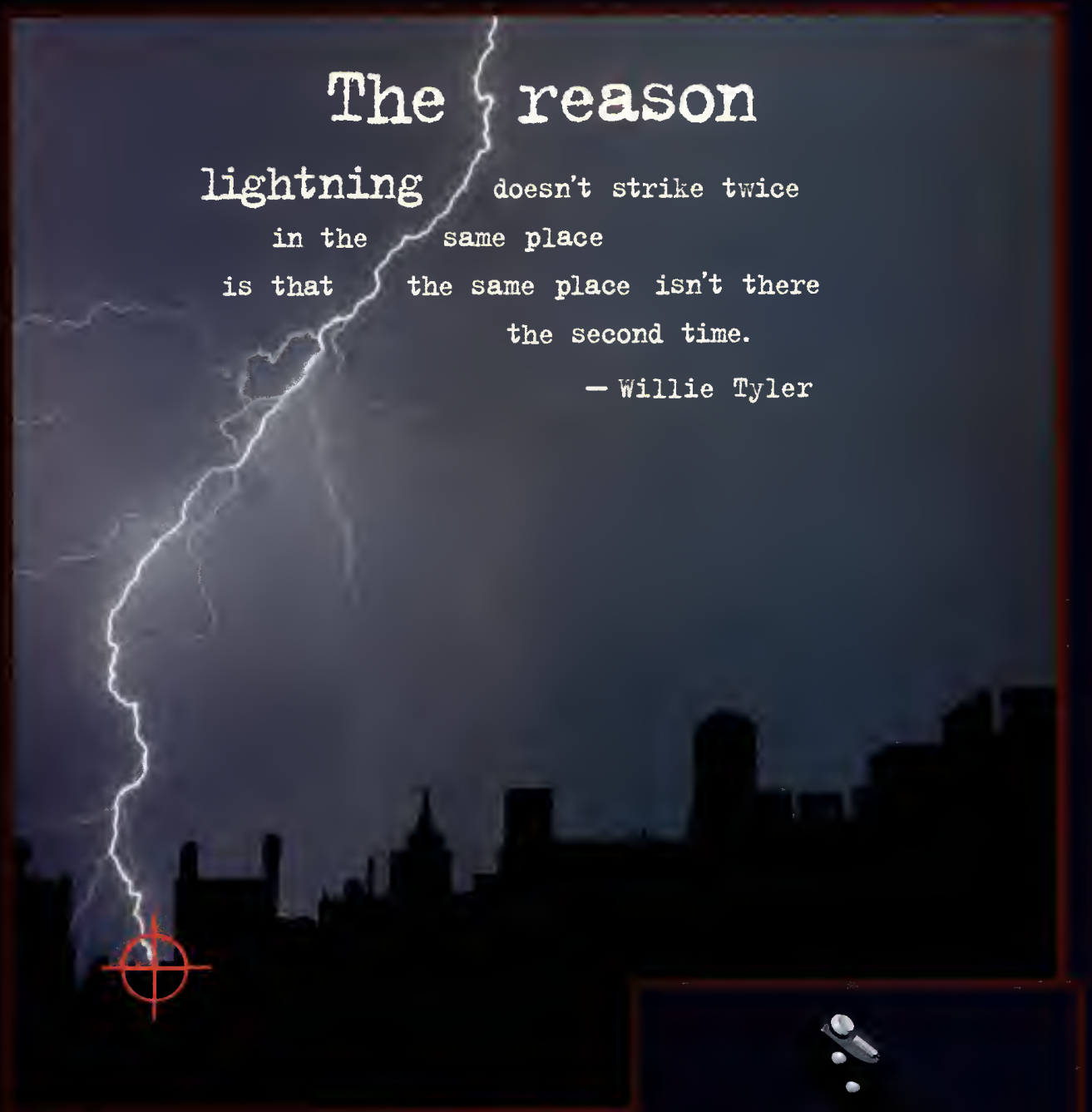
Ken Lobb, Nintendo

According to Lobb, frame rate has not been a problem, as the game runs consistently at 30 frames per second. It also incorporates some real-time lighting effects absent from the *KI 2* coin-op. "When the train comes in T.J. Combo's stage," says Lobb, "the light changes from green to red, and the whole background changes color and the characters change hue. That's a combination of pre-rendered and real-time lighting."

KI Gold will do for now, but N64 probably deserves better. ng

Great graphics, shame about the gameplay. With any luck, *KI* will quickly be superceded by a more involving N64 fighter

Along with the standard Arcade mode, Nintendo beefs up this 12 MB cartridge with a Training Mode, a Tournament Mode, and a Team Battle Mode. As in the Super NES version of *Killer Instinct*, the Training Mode instructs the player in combo skills



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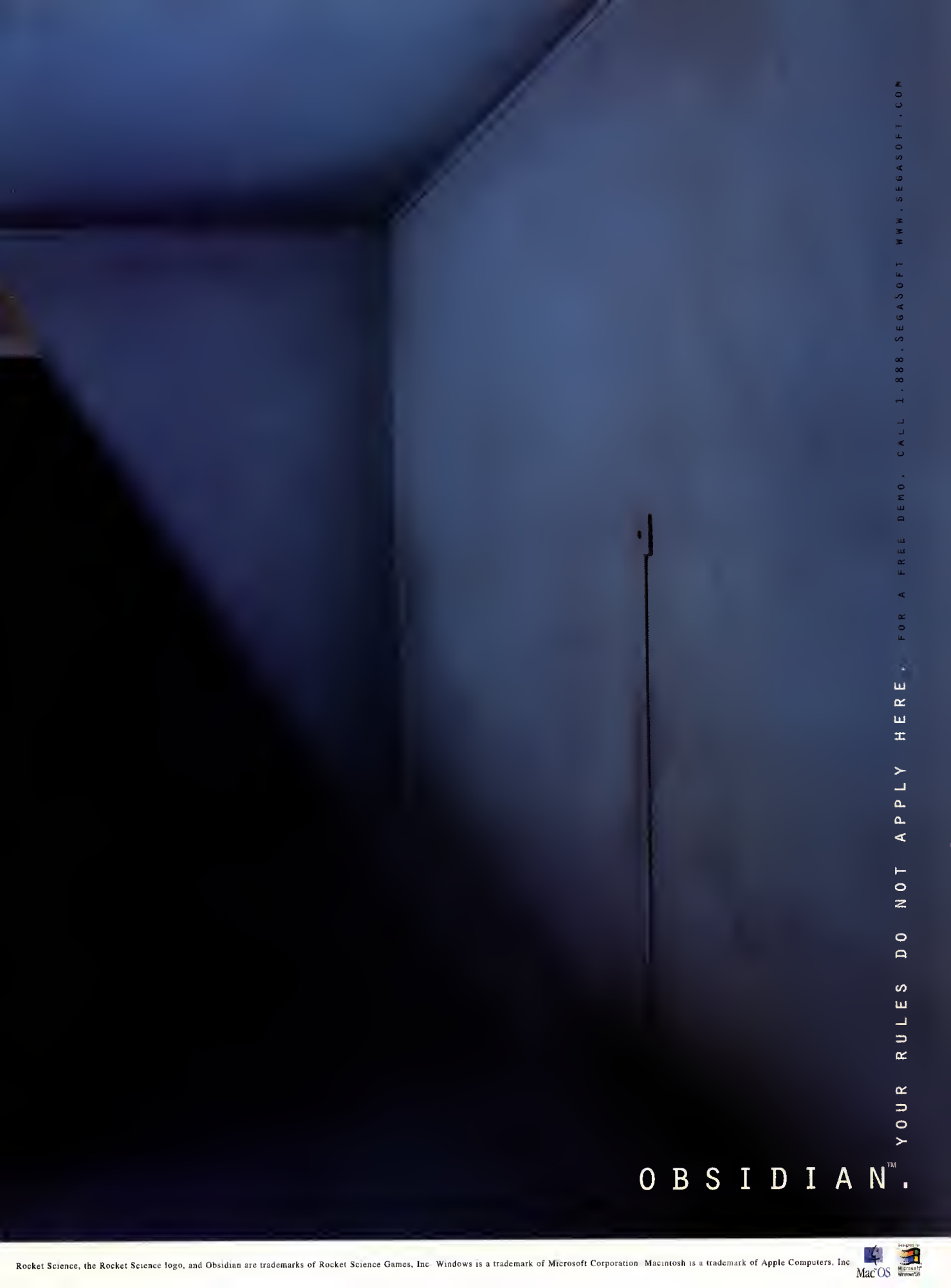

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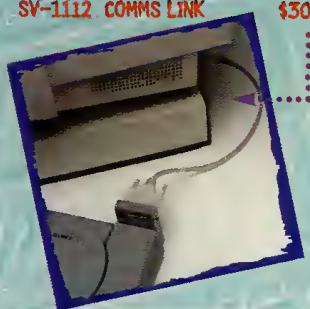

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Sony Computer Entertainment U.K.

Can the team responsible for *NBA Shoot Out* repeat its initial success or was it just a case of beginner's luck? **Next Generation** investigates behind the scenes of Sony's London, U.K. development headquarters

Porsche Challenge* (top) *and Rapid Racer* (above), two new games from the Sony studio responsible for *NBA Shoot Out

Juan Montes heads up Sony's London-based PlayStation development

Format:	**PlayStation**
Publisher:	**SCEA**
Developer:	**Sony**
Release Date:	**multi**
Origin:	**U.K.**

The best thing about releasing a good first game is that you instantly grab a reputation for quality. The worst thing is having to live up to it. That is the challenge now facing Sony's London, U.K. in-house development team — a group of 30 programmers, artists and designers, based in London's notorious den of downtown iniquity, Soho.

The team has two new projects well into development – *Porsche Challenge*, a racing game based around Porsche's forthcoming Boxster sports car; and *Rapid Racer*, another racing game, this time set on water. The game these titles must live up to is of course *NBA Shoot Out*, a visual tour de force and one of the most popular basketball games ever released — not a bad effort for a group who had never worked on a project together before, and which, at the time, consisted mostly of recent college graduates.

But Sony had a lot of faith in the group, and gave the team the freedom to develop its own style of production.

"In *NBA Shoot Out* we established a style and a vision of the type of games we'd like to develop internally', explains Juan Montes, general manager of software development, "and that's a mixture of trying to aim

"We're aiming for a very high degree of realism, and trying to push the PlayStation to the max"

John Roberts, Producer

ng alphas

for a very high level of realism, and using the PlayStation to the maximum." Along with technical innovation, though, Montes is keen to stress the importance of playability in any game concept discussed by the team. "You cannot forget gameplay, because as soon as you do, you end up with nothing but lots of nice pictures."

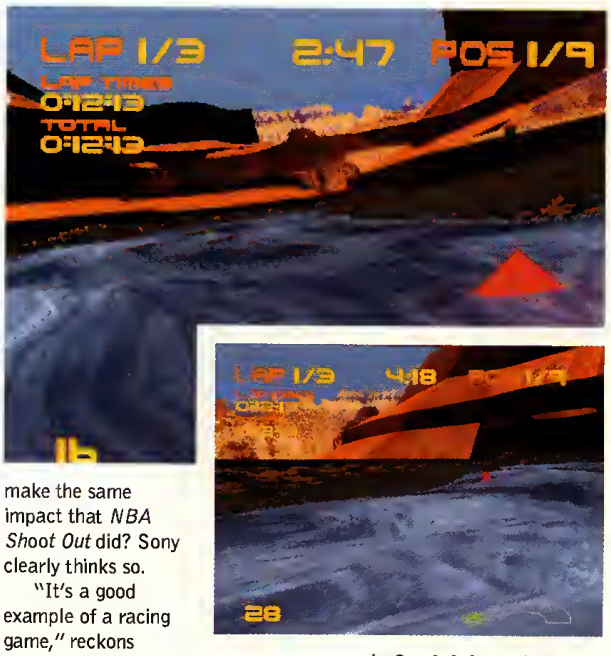
Montes' philosophy does not restrict the type of games developed, but dictates how games should be produced and who should get a say in the process. As Montes points out, "Anyone could come up with the next 'hit game' so I arrange a discussion on the first Friday of every month and in that discussion we usually have between 12 and 15 people. Everyone in the office is invited to attend, it's not restricted to game designers or producers — it's a lot more open. We have someone who works in the print department who plays a lot of games and has a lot of ideas — he usually comes along. I don't believe that you should inhibit the natural creative process that exists in the industry."

"We have someone in the print department who plays a lot of games and has a lot of ideas"

Juan Montes, General Manager

In other words, Montes believes in recruiting people who may not necessarily be the most experienced or the most expensive, but people who have a passion for games and a few good ideas.

Both *Porsche Challenge* and *Rapid Racer* have been in development for over a year. The concern in the initial R&D stages was to explore the advanced technical aspects of the titles fully so that drastic changes would not have to be made at a later date. But can *Porsche Challenge* — a game that has been preceded by dozens of racing titles — make the same impact that *NBA Shoot Out* did? Sony clearly thinks so.



Sony's in-house team spent six months perfecting the water dynamics for *Rapid Racer*. Consequently, elements such as waves and turbulence will play a realistic and important part of each race

"It's a good example of a racing game," reckons Montes. "The design includes interactive music, interactive tracks, realtime lighting for the highest level of realism, and excellent driving control. It's also fun to play and has endless appeal. Technically, we started R&D very early in development and reached all our targets. We didn't make any concessions on quality."

Of course the main coup for Montes and his team was to secure an official license from Porsche. The final agreement allowed the game's designers to work closely with Porsche to create an accurate representation of the Boxster, both in terms of look and performance. The result is an incredibly detailed in-game model which not only resembles the real thing but also looks good enough to appear in a prerendered sequence (producer Pascal Jarry was rather furtive, but claims that between 400 to 500 Gouraud-shaded, textured polygons are used for the player's car).

But will such graphical luxury slow the game down? Apparently not. The designers are aiming for a 30fps frame rate and the engine was smooth in the early incarnation Next Generation saw. However, there was very little landscape detail on show — a situation which the artists insist is temporary — and so a question mark remains over the final frame rate.

Away from speed concerns, attention to detail has opened a few stylistic doors for the designers. One of

There will be 25 circuits in the finished *Porsche Challenge*, including the famous test track in Stuttgart. Landscapes currently look empty

Sony was privy to collateral Porsche information, including the dimensions of its complex German test track in Stuttgart

the most noticeable elements of the Boxster is the fact that it is a convertible, and the Sony team have capitalized on this by giving the player a choice of six different characters to sit behind the wheel, à la *Power Drift*. Each of these characters has actually been motion captured and all have their own distinctive movements during play. It's a superficial detail, but may give the game a more leisurely look, providing a distinct aesthetic contrast to the overabundance of more serious sporting racing games already available. It's also a respectful tip of the hat to Yu Suzuki's *Out Run*, a favorite of all race game design teams.

The realism evident so far in the project doesn't stop at the Boxster car itself. Sony was privy to collateral Porsche information, including the dimensions of the company's famously complex test track in Stuttgart. As a result, the track is included in the game along with 24 other circuits, split into five different courses.

As for gameplay, the title is at such an early period of development this is still an unknown factor. Sony has confirmed that there will be a split-screen two-player option, which should add much to the game's appeal, and the interactive circuit feature sounds interesting — fast drivers are rewarded with hidden short cuts and bonuses, but other racers will be able to find other short cuts to catch up. The designers also claim that there are myriad other secrets and cheat modes within the circuits for players to discover during play.

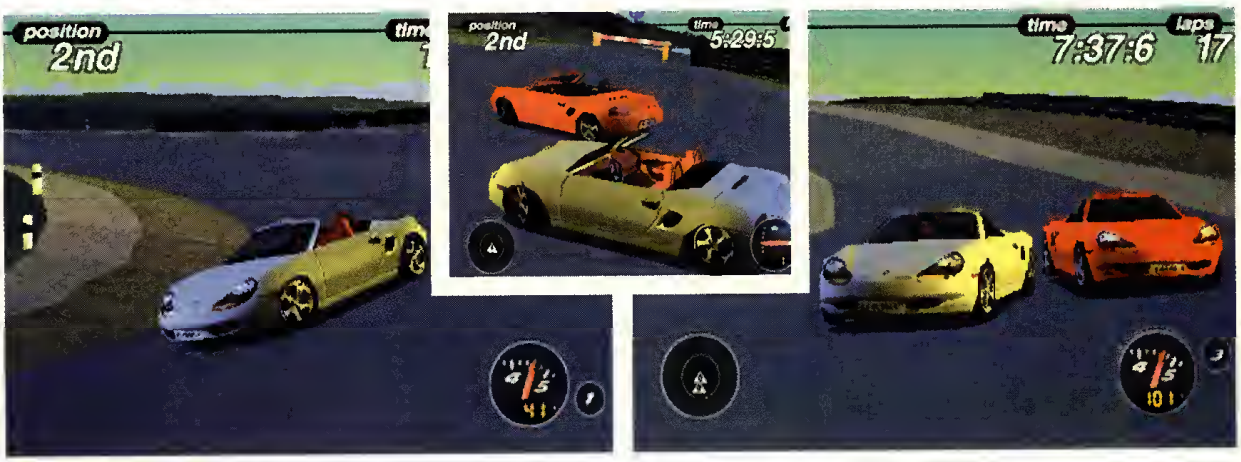
There are further features which mark out the title. For example, Porsche Challenge features an "intelligent" catch-up feature which enables players who are straggling behind to make less mistakes and to have a higher top speed. Impressively, the leader cannot lose his position because of the catch-up system — he'll only lose it through his own bad driving. This AI achievement is a significant advance. In most games — Sega's *Virtua Racing* included — you can stay behind the leader until the very last second and then use the catch-up to zoom past and over the finish line, hence eliminating any competitive spirit.

It is clear, then, that the team is not relying solely on the Porsche license to attract gamers. Although this has of course been well exploited, many small refinements to the racing genre are being made within the game.

Whereas *Porsche Challenge* has a ready-made audience of fast car lovers, *Rapid Racer* will have a lot to prove when it is released next year. Water racing games seem to be a new-found game genre, and with Nintendo's imminent *Wave Race 64* and a slew of jetskiing coin-ops appearing soon, head-to-head comparisons will be inevitable.

It's a challenge which has been taken seriously by Sony. As Montes explains, "With *Rapid Racer* we spent six months modeling the water, how it moves, and so on, to try and make it as realistic as possible. Consequently the water is not just made out of sprites that always move in the same direction

Juan Montes: "It's very important to build up strong teams where everyone counts and responsibilities are clear"

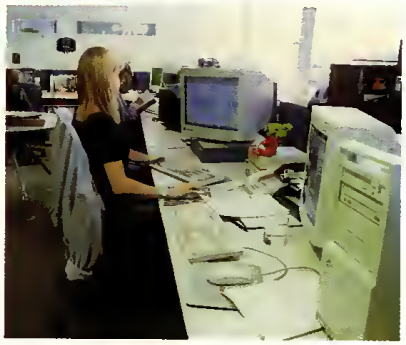


The Porsche Boxster model that appears in the game is accurately based on the real vehicle which is due to appear on the roads later this year. The 3D model is constructed from between 400 to 500 polygons and then Gouraud shaded. The designers of the game worked very closely with Porsche to ensure authenticity. In the finished game, each of the cars will have its own motion captured driver, rather than zooming around the track pilotless

ng alphas

whenever you go to the same place. We studied how immersed objects affect water and how they affect things around the water like rocks, and so on. We also looked at how spray is produced when you have something touching the water. We tried ways of capturing water movement that were very effective, but took up too many cycles for the machine, so we then looked at other ways where you could still have a similar level of realism but with more optimized code."

The result of all this experimentation is an incredibly complex series of water courses, each alive with complicated liquid currents and swells. Elements such as spray, wakes and waterfalls are also included and all of these affect the handling of the player's boat as it competes. Smashing though a wave, for example, will slow the boat down, as will getting caught in the turbulence of another boat's wake. It's an attempt to provide a real watersports experience, rather than just having a blue road and hoping no-one notices it doesn't move.



John Roberts (ebove) senior producer at Sony. "*NBA Shoot Out* wee our first product end we went every title to get the acclelm it hae hed." Sony's London development facilities (right)

To accompany the advanced water physics, *Rapid Racer* offers a similar list of attributes to *Porsche Challenge*. The vehicles are detailed, texture-mapped models and the circuits (there are 18 placed over six courses) all feature hidden shortcuts and cheat modes to add to the longevity. As with *Porsche Challenge*, the courses are at a very early stage so it is difficult to assess the game graphically. The interactive water does look rather strange at the moment: Although it is clear that there are currents moving independently of each other, the water still looks flat, like some kind of trippy texture effect. Have Sony been forced to sacrifice aesthetic concerns in favor of realism? Later versions are bound to provide an answer, but Montes is keen to stress that the emphasis is on gameplay.

The Sony team's offices located in downtown Soho. Although U.S. gamere were ewere of missing subtleties, many Europeen gamers found it difficult to eccept that *NBA Shoot Out* wes made in London not the U.S.

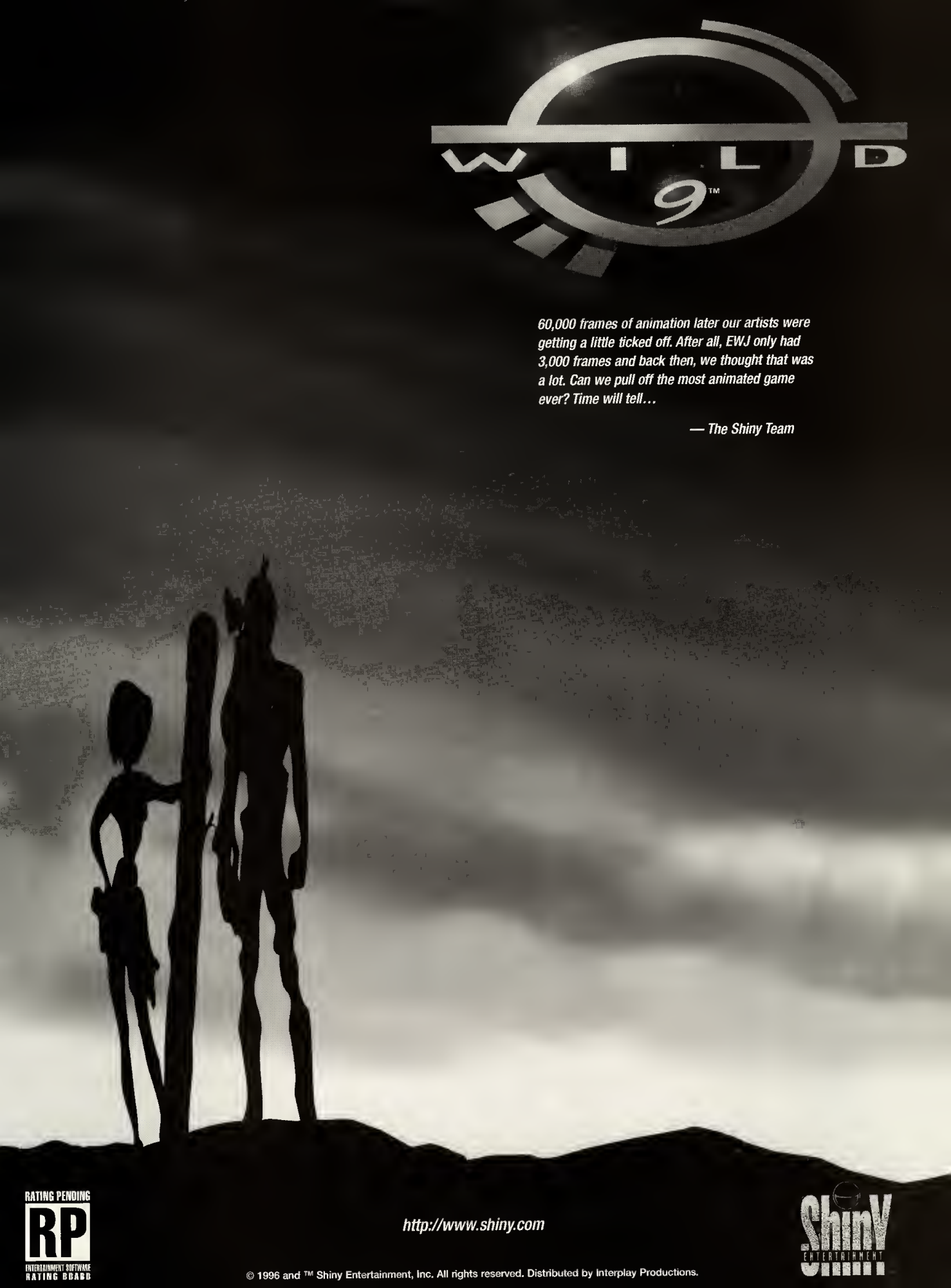
Almost inevitably, despite Sony's new interest in the racing genre, *NBA Shoot Out* has not been laid to rest. *NBA Shoot Out '97* is currently also in development and Montes promises improved motion capturing and new moves based on those performed by real basketball players. Next Generation saw an early video of the title in action and it looked astonishing. Perhaps most importantly, the players in the game now resemble their real world counterparts, marking a huge step forward in the team's quest to bring as much realism as possible to its games.

So it looks like Sony's gamble — to employ a young, inexperienced, U.K. team and give it total creative freedom — has paid off incredibly well, so far at least. *NBA Shoot Out* was a commercial and graphic triumph (it was a smash hit in Europe) and if only half the realism and technical audacity on display in that game finds its way into *Porsche Challenge* and *Rapid Racer*, they should both be exceptional titles. John Roberts, senior producer, points out, "I'm quite fortunate. We don't find ourselves under as much pressure as I've had with other publishers to get the games finished and released. We can spend a lot of time and cost to get them right, and we won't release them unless they're right because our reputation could suffer. We need to build on it. *NBA Shoot Out* was our first product and we want each and every title to get the acclaim it has had."

"*NBA Shoot Out* was our first product and we want every title to get the acclaim it has had"

John Roberts, Producer

While SCE Japan has enjoyed mixed success with technically astute but flawed titles such as the *Jumping Flash!* and *Motor Toon GP* series, the London team's efforts, combined with those of developers such as Psygnosis and Neon, should continue to ensure that Europe is acknowledged as a major centre for imaginative innovation and technical know-how. Which can only be good news for the PlayStation. ng



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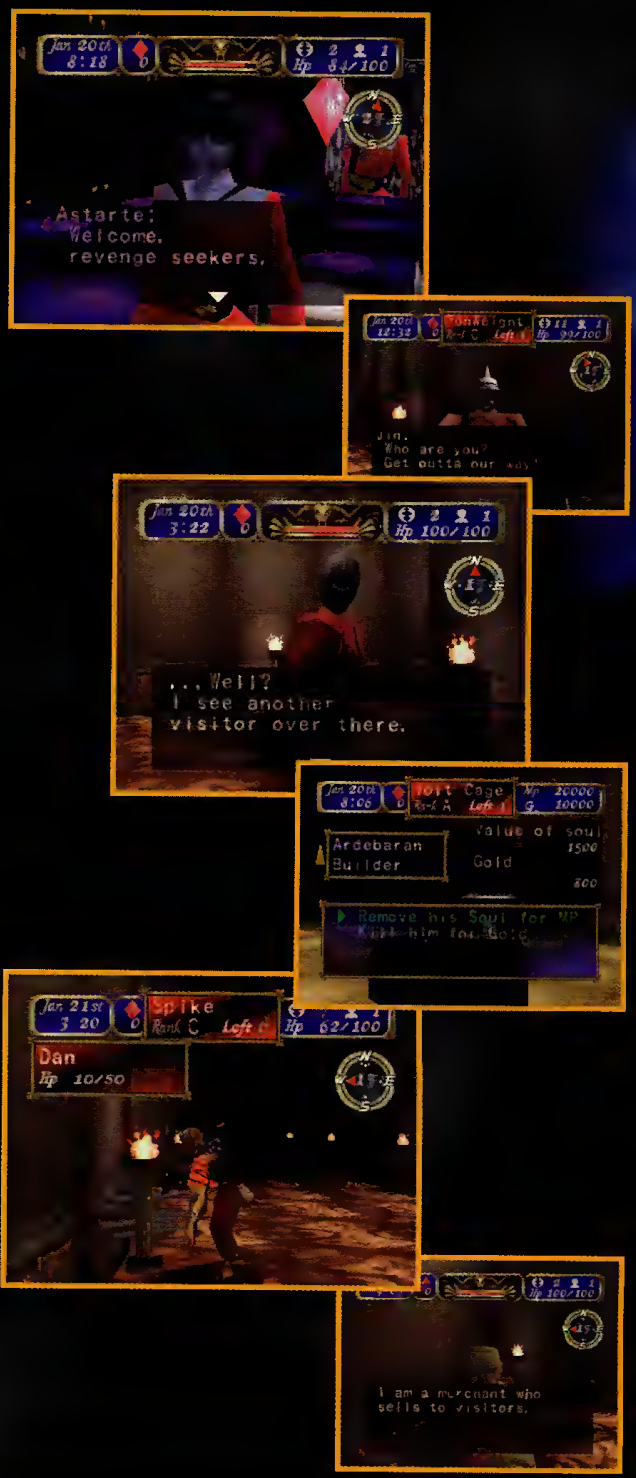

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